A HAND-BOOK

TO THE

FLORA OF CEYLON.

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FLORA OF CEYLON

CONTAINING

DESCRIPTIONS OF ALL THE SPECIES OF FLOWERING PLANTS INDIGENOUS TO THE ISLAND,

AND

NOTES ON THEIR HISTORY, DISTRIBUTION, AND USES.

BY

HENRY TRIMEN, M.B. (LOND.), F.R.S.,

DIRECTOR OF THE ROYAL BOTANIC GARDENS, CEYLON.

With an Atlas of Plates

ILLUSTRATING SOME OF THE MORE INTERESTING SPECIES.

Part I.

RANUNCULACEÆ—ANACARDIACEÆ.

WITH PLATES I—XXV.

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INTRODUCTORY.

(ISSUED WITH PART I.)

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ONE principal object of this Handbook is to enable observers in Ceylon to ascertain the name of any plant they may find growing wild. When this is arrived at, they are in a position to learn all that may have been written about it in botanical and other literature, to appreciate its relationships with other plants, to trace its distribution in other lands, and to intelligently investigate its properties and uses.

The analytic Keys and descriptions here given for this purpose require for their use a general knowledge of the outside anatomy and structure of the principal organs of plants and of the terms in use for defining and distinguishing their different parts and modifications. This knowledge can be readily obtained from any elementary work on Botany, and is here presupposed. The descriptions are, however, as little technical as I can make them consistently with accuracy.

The book refers to Ceylon *only.* In the definitions of the Natural Orders and Genera it must be distinctly understood that the distinguishing characters here given for each group do not include the whole of those which belong to it, but such only as are shown by the species found in Ceylon. It is especially necessary to bear this in mind in using this Handbook for educational purposes; for it may so happen that the Ceylon members of a particular Order or Genus are more or less exceptional, and in that case the definition given will be by no means characteristic of that group as a whole.

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To a less extent this applies also to each species. My descriptions have been made wholly from Ceylon specimens, and will thus often be not comprehensive enough to cover the range of form exhibited in other countries. I have, indeed, throughout this Flora endeavoured to restrict all the information given under each species to it as a Ceylon plant only, excluding, as a rule, everything referring only to Peninsular India, Malaya, or other regions beyond our limit.

PLAN OF THIS HANDBOOK.

The sequence of the Natural Orders and Genera is that followed in all recent English systematic Floras, viz., that of Bentham and Hooker's 'Genera Plantarum.' For the species I have kept mainly to the 'Flora of British India,' with which important work it is highly desirable that this Flora should be in general accordance. When any deviation occurs from these standard books, attention is always drawn to it.

After a diagnostic description of each Order there follows a brief Key for the rapid determination of its Genera; and a fuller description of each Genus is afterwards given with a similar Key to its species. Each species is treated in paragraphs on the following plan :—

1. The *Botanical Name* * (in Clarendon type) immediately followed (in Italic type) by a reference to the authority by whom that name was first published, with the date.

No botanical name in the modern taxonomic sense can be of earlier date than 1753, when Linnæus first definitely published his binominal nomenclature.†

The *Vernacular Names* when known (also in Clarendon

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* When of any local interest, the derivation of the generic and specific names is given in a foot-note.

† I may mention here at once that, for the sake of convenience of reference, I have uniformly written the adjective indicating nativity to Ceylon *zeylanicus-a-um*, disregarding the various other modes followed by authors, e.g., *ceylanicus*, *zeylonicus*, &c.

type) follow, the letters S. and T. signifying Siṇhalese and Tamil respectively.

Tamil is the language and race of the Northern and Eastern Provinces only; the rest of the island is Siṇhalese. There is, however, also a large immigrant Tamil population (from Southern India) employed as coolies upon estates, chiefly in the Central Province. I am conscious of great imperfection in these names, and further research will doubtless add largely to those here given, and correct many errors. Lists of some of the common S. and T. prefixes are appended (A.).

2. *References* (in small type) arranged chronologically, to published books and papers where the species is treated of or noticed as a Ceylon plant, with any names (= synonyms) there given when different to the one adopted.

A very large number of works is referred to, for I have endeavoured to make these local quotations as complete as possible; but there are a few which are so regularly quoted that an explanation of them is at once necessary:—

Herm. Mus. [P. Hermann], Musæum Zeylanicum, 1717. A catalogue, mostly under their Siṇhalese names, of the collection of dried plants collected by Hermann in 1672–77 in the neighbourhood of Colombo, and now in the British Museum [pp. 71].

Burm. Thes. J. Burman, Thesaurus Zeylanicus, 1737. An alphabetical catalogue of the plants of Ceylon compiled from collections made by Hermann and Hartog. Contains 110 good plates [pp. 250].

Fl. Zeyl. C. Linnæus, Flora Zeylanica, 1747. A catalogue, arranged on the Linnean system, of the Ceylon plants contained in Hermann's own Herbarium above referred to. 429 species are determined and placed in their genera, leaving 228 species undetermined [pp. 275 and 4 plates].*

Moon Cat. A. Moon, Catalogue of Indigenous and Exotic Plants of Ceylon, 1824. A list, arranged on the Linnean system, of all the plants recorded from Ceylon, with their Siṇhalese names, and with references (often incorrect) to a few other authors. 1127 species are given, of which 164 were considered to be new ones, and there are also 366 cultivated plants included. A second part consists of an alphabetical list of Siṇhalese names [pp. 77, 41].

Arn. Pug. G. A. Walker-Arnott, Pugillus Plantarum Indiæ Orientalis, 1836 (In Nova Acta L. C. Acad. Nat. Cur. vol. xviii.). Full descriptions of a number of new species collected by Col. and Mrs.

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* At the date of this book Linnæus had not invented his binominal system of nomenclature, and no species are therefore *named* in it. For a critical determination of all the specimens in Hermann's Herbarium see my paper in Journ. Linn. Soc., vol. xxiv. pp. 129–155.

Walker from 1820 onwards (a few Southern Indian species are also included) [pp. 38].

Thw. Enum. G. H. K. Thwaites, Enumeratio Plantarum Zeylaniæ, 1858–64. A complete catalogue, with references and synonymy, of all the known plants of the island arranged on the Natural System, and with descriptions (in Latin) of the many new species [pp. 483]. An extremely accurate and most valuable work; from which I rarely find it possible to differ materially.

Trim. Cat. H. Trimen, a Systematic Catalogue of the Plants of Ceylon, 1885 (in Journ. R. Asiatic Soc., Ceylon Branch, vol. ix.). A list, corrected and completed up to date of publication, of all the Ceylon species; arranged according to the 'Genera Plantarum' [pp. 137].

The *C.P. numbers.*

These are always quoted. They refer to the large series of dried specimens of Ceylon Plants (4024 numbers in all) made up by Dr. Thwaites from his own and his predecessors' collections, and widely distributed by him to herbariums and botanical museums throughout the world. The herbarium at Peradeniya contains a very complete series, and the numbers quoted are always those in that collection, which must be regarded as the type-series.*

3. A reference (also in small type) to the '*Flora of British India*' and to selected published *Figures* of the plant.

Much additional information will be found in the 'Fl. B. Ind.' about all such of our species as extend into any other of the countries included in that work. In quoting figures preference is given to such as are known to have been made from Ceylon specimens.

4. The *Description* (in larger type).

Whenever possible, this has been made from fresh living specimens; it is as brief as is consistent with completeness and with sufficiency for accurate identification.† A list of the few abbreviations employed is appended (B.).

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* Latterly, however, Thwaites suppressed many of his early numbers, adopting a single one only for each species (as he considered it). Hence several numbers do not now appear in Herb. Perad., being there sunk under other ones.

† It may be well here to define the sense attached by me to certain common terms which are rather variously employed in descriptive floras. *Oval*=equally tapering to either end and about twice as long as broad; *lanceolate*=equally tapering to either end and about 3 times as long as broad; *oblong*=more or less parallel-sided. I do not employ the term *elliptic* at all.

5. The general *distribution in Ceylon* and the comparative frequency (in small type); followed, in the case of the rarer species, by special *localities.*

Very much has yet to be done in tracing out the distribution of our plants through the island, and the information here given is very imperfect, and will be much modified and increased by further investigation. A brief account of the climatic regions and zones of altitude is appended (C.).

The *time of flowering* and *colour* of the flowers.

The flowering period is liable to considerable variation in different years and in different climatic districts, being dependent to a considerable extent on varying distribution of the rainfall; the months here given, correct as far as they go, cannot be regarded as at all exhaustive.

6. The general range of *distribution beyond Ceylon* (also in small type).

Usually taken from the 'Fl. Brit. Ind.' with occasional additions or modifications.

Any subsequent paragraphs are occupied with brief notes on the history and nomenclature of the species, on any special peculiarity in its structure, and on its properties, products, and uses.

Intercalated in their proper places among the species thus fully treated are certain other plants which are not natives of Ceylon, but have been certainly *introduced* by the agency of man, and are now met with in a more or less completely wild or naturalised state. The names of these are printed in Italic, not Clarendon, type, and the whole account runs on in a single paragraph.

The *coloured figures* (in 4to) accompanying this book are a small selection only from the extensive series illustrating the Ceylon flora which is preserved in the Library of the Botanic Gardens at Peradeniya. This was commenced more than fifty years ago, and has been steadily continued under successive Directors. It now numbers several thousand drawings, and has been wholly the work of three members

of one Sinhalese family employed successively as draftsmen on the Garden staff—Haramanis de Alwis, and George and William de Alwis, his sons. The last-named has been the draftsman for the last twenty-seven years, and most of the drawings here reproduced are his work. It should be added that many of the detailed dissections are the work of Dr. Thwaites.

I am well aware of the imperfections in the following pages. Many gaps remain to be filled up and doubtful points elucidated, to investigate which I have not had time or opportunity. Much remains to be done by others, and indeed it is only by the co-operation of many observers that anything like completeness in the account of a large tropical flora can be attained. I hope that one result of this publication may be to stimulate such observation and inquiry by those who have the opportunity to make them. These cannot fail to add numerous facts and correct many errors; and I may add that any help, however small, of this kind, if communicated to me, will be gratefully received and utilised.

HENRY TRIMEN.

ROYAL BOTANIC GARDENS, PERADENIYA.
January, 1893.

APPENDICES.

(A.)

COMMON PREFIXES IN THE VERNACULAR NAMES OF PLANTS.

1. Sin̥halese.

Balu	Dog.
Bin̥ or Bim̥	Ground.
Bū	Woolly.
Dāra	Angular.
Dat	Tooth.
Divi	Tiger.
Diya	Water.
Dodan̥	Orange.
Dunu	Bow.
Ẹla or Ẹli	Pale, white.
Ẹmbul	Sour.
Ẹt	Great.
Ẹta	Seed.
Gal	Rock.
Gam̥ or Gan̥	Village, native.
Gan̥	River.
Gas	Tree.
Gedi	Fruit.
Geta	Knot, joint.
Goda	Land (dry).
Gon	Bullock.
Góna	Sambur Deer.
Han̥ or Ham̥	Skin.
Hel	Lofty.
Hín	Small.
Hó	Bad.
Hoñda	Good.
Hulan̥	Wind.
Ira or Iri	Striped.
Kaha	Yellow.
Kahata	Astringent.
Kalu	Black.
Karal	Pod.
Kana	Edible.
Katu	Thorny.
Kiri	Milk.
Kola	Leaf.
Kudu	Powder, dust.
Lunu	Salt.
Maha or Mā	Large.
Mal	Flower.
Mi	Honey.
Mían̥	Buffalo-horn
Mūdu	Sea.
Mula or Mul	Root.
Nága or Nayi	Cobra.
Nil	Blue or green.
Palá	Herbaceous.
Panu	Worm, insect.
Pat	Leaf.
Pattá	Bark, fibre.
Pẹni	Sweet.
Pini	Dew.
Piti	Flour.
Potu	Bark.
Rana or Ran̥	Golden.
Rata	Foreign.
Ratu or Rat	Red.
Sudu	White.
Suvanda	Fragrant.
Tel	Oil.
Titta	Bitter.
Úrá or Úru	Pig.
Wal	Wild.
Walu	Clustered.
Wana	Jungle.
Wata	Round.
Wel or Wela	Climber.
Wẹli	Sand.
Wila	Marsh.
Yaka or Yak	Devil (=wild).

2. *Tamil.**

Ạnai	Great.
Chiru	Small.
Che	Red.
Eṇṇei	Oil.
Erumai	Buffalo.
Káḍḍu	Jungle, wild.
Kai	Hand.
Kal	Stone.
Karu	Black.
Káy	Fruit.
Koḍḍai	Seed.
Koḍi	Climber.
Kuḷam	Tank.
Mán	Deer.
Manchal	Yellow.
Maram	Tree.
Mul	Thorn.
Nákam	Cobra.
Nal	Good.
Nari	Jackal.
Nái	Dog.
Nír	Water.
Pachu	Cow.
Pal	Tooth.
Pál	Milk.
Peru	Large.
Péy	Devil (=wild).
Poṇ	Golden.
Teṇ	Honey.
Vaḍḍu	Round.
Veḷḷai	White.
Vér	Root.

(B.)

ABBREVIATIONS USED IN THE DESCRIPTIONS.

l.	leaves.
lflts.	leaflets.
stip.	stipules.
infl.	inflorescence.
ped.	pedicels.
fl.	flowers.
cal.	calyx.
sep.	sepals.
cor.	corolla.
pet.	petals.
segm.	segments.
stam.	stamens.
fil.	filaments.
anth.	anthers.
ov.	ovary.
carp.	carpels.
fr.	fruit.
def.	definite.
indef.	indefinite.
lat.	lateral.
alt.	alternate.
opp.	opposite.
fem.	female.
ft.	feet.
in.	inches.
T.	Tamil.
S.	Siṇhalese.
Herb.	Herbarium.

An asterisk (*) *before* the name of a species indicates that it has probably been introduced into Ceylon by human agency.

Species included in [ ] are such as have been erroneously recorded as Ceylon plants.

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* In combination, the terminations of these prefixes are often modified according to the initial letter of the word with which they are compounded.

(C.)

A SKETCH OF THE CLIMATIC REGIONS OF CEYLON.

THE island may be divided into three regions, distinguished by varying amounts of rain and of temperature, and marked by characteristic differences in their floras. And, though it is of course the case that there are no abrupt lines of demarcation, yet it is also the fact that the great proportion of our species are restricted to one or two of these climatic regions, only a few occurring throughout the area. These regions are, briefly:—(1) The dry low-country region; (2) The moist low-country region; and (3) the montane region or hill country.

1. *The Dry Region.*—This is by far the most extensive, occupying nearly four-fifths of Ceylon in a continuous area, and comprising the whole of the Northern, North-central, and Eastern Provinces, with the greater part of the North-western, and portions of the Central, Southern, and Uva Provinces. The whole is included in the 'low country,' and for the most part is considerably below 1000 ft.; but a few isolated rocky hills rise out of the plain, of which the following are the highest:—Ritigala, 2506 ft.;* Kokagala, 2241 ft.; Friar's Hood, 2148 ft.; Westminster Abbey, 1829 ft.; Gunners Quoin, 1736 ft.; Yakdessa, 1712 ft.; and three or four more between 1500 and 1000 ft. (Dambulla, 1118 ft.). The rainfall nowhere exceeds 75 inches per annum, and falls mostly between October and January during the north-east monsoon. Portions of this region about Mannar on the north-western coast and Hambantota on the south-eastern have a rainfall of under 50 in., which all falls in a short time, so that they possess an almost desert climate with a long period of drought. The vegetation of this great tract is mainly Peninsular-Indian in character, and very few of our endemic species are found within it.

* For a brief account of the flora of this remarkable isolated mountain see Journn. R. As. Soc., Ceylon Branch, vol. xi. p. 156.

2. *The Moist Low-country Region.*—Though occupying less than one-fifth of our area, this is by far the best known, the richest, and the most interesting part of the island; and it is that from which impressions of its climate and vegetation have been mostly derived. It comprehends the whole of the Western Province, the greater part of the Southern and Sabaragamuwa Provinces, a large portion of the Central Province, and small tracts in the Uva and North-western Provinces. I fix the upper limit of this region, where it passes into the montane zone, at 3000 ft.; and it is convenient to divide it into a lower and an upper zone by the line of 1000 ft. A very large number of truly tropical species never occur above this last elevation, or, indeed, much above sea-level. In the lower zone, however, are several small isolated hills—the highest of which is Hiniduma Kande, 2160 ft.—which are usually of especial interest as the home of many endemic species. The rainfall over this region varies from 75 up to 200 in. per annum, and is well distributed over the year, falling in both the north-east and south-west monsoons, and especially in May and June during the latter season. A short dry time occurs during some portion of the first quarter of the year, and often again in August and September, the rest of the year being more or less rainy. This wet tropical region is the home of the great bulk of our endemic species, the majority of which show a strong Malayan affinity.*

3. *The Montane Region or Hill Country.*—This includes all the country above 3000 ft. elevation, and occupies about one-twelfth of our area; *i.e.*, as seen on a map. It lies wholly

* See my paper in Journ. R. As. Soc., Ceylon Branch, vol. ix. p. 139. It must be borne in mind that the climatic regions above described are not sharply defined, but pass into one another. Between the dry and moist regions there exists a fairly marked intermediate tract, well developed about Kurunegala, Nalande, Haragama, Medamahanuwara, Haldummulla, Tangalle, and especially in the Wellasse district of Uva and adjoining portions of the Eastern Province. The vegetation of this zone has remarkable characters, and requires more investigation than it has yet received.

in the moist region, *i.e.*, the rainfall is nowhere less than 75 in. per annum. In most parts the fall is much greater, and in some localities in the Adam's Peak Range reaches 250 in. or even more, mostly falling during the south-west monsoon, which strikes with full power on the escarpment having that aspect.

The hill country occupies a large portion of the Central Province and of the Provinces of Uva and Sabaragamuwa, and very small parts of the North-western and Southern Provinces, the whole mountain mass being thus situated S.W. of the centre of Ceylon. It is separable into four blocks :—1. *The main block*, which lies to the south and is by far the largest, comprising the great extent of hill country extending from Dolosbage on the west to Madulsima on the east, and from Hantane and Maturata on the north to the Adam's Peak Range and Haputale on the south. 2. *The north-western block* or chain, running northwards, and separated from or connected with the last by the narrow Kaduganawa Pass (1700 ft.). 3. *The north-eastern block* or chain, isolated from the main block by the Dumbara Valley and Mahaweli River, and from the north-western block by the Matale Valley; also running northwards. 4. *The southern block*, much smaller, isolated in the Province of Sabaragamuwa, and forming the district of Rakwane.

It is convenient to divide this region into a *lower* and an *upper montane zone* by the line of 5000 ft. altitude, which is found to form a fairly good lower limit for our more truly montane species (*Rhododendron arboreum* may be regarded as a good example). Nearly the whole of the upper zone is found in the main mountain block, a little in the north-eastern, but none in the north-western or southern blocks. It chiefly consists of the considerable tracts of table-land known as plains (Nuwara Eliya Plain, about 6200 ft.; Elk and Horton Plains, over 7000 ft.), and the mountain-tops standing round them.

The following are some of the highest or best-known peaks and elevations in the two zones of the montane region :—

In the *Upper Montane Zone* (above 5000 ft.).

In Main Mountain Block :—

Pedurutalagala	8296 ft.	Mahakudagala	6901 ft.
Kirigalpota	7832 ft.	Namunakula Kande . .	6680 ft.
Totapella	7746 ft.	Elbedde Kande (Agras) .	6630 ft.
Adam's Peak	7353 ft.	Diyatalawa	5021 ft.
Great Western Mt. . .	7264 ft.	Narangala (Badulla) . .	5006 ft.

In North-eastern Block :—

Knuckles Mt.	6115 ft.	Dumbanagala.	5288·6 ft.

In the *Lower Montane Zone* (3000–5000 ft.).

In Main Mountain Block :—

Dorapotagala (Madulsima)	4972 ft.	Medamahanuwara . . .	4372 ft.
Raxawa (Dolosbage) . .	4774 ft.	Old Hantane Estate . .	4119 ft.
Laxapanagala	4637 ft.	Moneragala	3811 ft.

In North-western Block :—

Hunasgiriya Mt. . . .	4955 ft.	Ambokka	4031 ft.
Etapola	4143 ft.	Alagala	3394 ft.

In Southern Block :—

Pettiagala Kande . . .	4678 ft.	Kondurugala	4107 ft.
Gongala	4445 ft.	Kiribatgalakande . . .	3098 ft.

I.—RANUNCULACEÆ.

PERENNIAL herbs or climbing shrubs; l. alternate or opposite, without stip., simple or compound; fl. regular, bisexual; sep. 4, 5 or more, imbricate or valvate, often petaloid; pet. 5 or more, imbricate, often absent; stam. indef., distinct, free; carp. numerous, distinct, each with a solitary pendulous or erect ovule; seed with minute embryo in abundant endosperm.

Climbing shrubs with opposite leaves (*Clematideæ*)
  Petals none . . . . 1. CLEMATIS.
  Petals many . . . . 2. NARAVELIA.
Herbs.
  Petals none (sepals petaloid) (*Anemoneæ*)
    Fls. large, sepals 5–8 . . . . 3. ANEMONE.
    Fls. small, sepals 5 . . . . 4. THALICTRUM.
  Petals 5 (*Ranunculeæ*) . . . . 5. RANUNCULUS.

An order of temperate and cold regions chiefly; all our genera but *Naravelia* are British also. Of our few species all are montane except *Naravelia* and one *Clematis*.

1. **CLEMATIS**, *L.*

Woody climbers; l. opp., without stip.; infl. axillary, compound, large; sep. 4, more or less petaloid, valvate; pet. 0; stam. numerous; carp. numerous, ovule solitary, pendulous; fr. a head of achenes, each terminated by a long copiously bearded tail (style).—Sp. about 100; 20 in *Fl. B. Ind.* Both our species belong to Sect. *Flammula*, DC.

Leaves simple . . . . 1. C. SMILACIFOLIA.
Leaves compound . . . . 2. C. GOURIANA.

1. **C. smilacifolia,** *Wall, in Asiatic Res.* xiii. 414 (1819). **Nara-wel,** S.

Thw. Enum. 1. C. P. 2690.

Fl. B. Ind. i. 3 (not given for Ceylon). Wight, Ill. i. t. 1 (*C. Munroana*). Bot. Mag. t. 4259.

A woody climber, branches glabrous; l. simple, ovate, subcordate at base, entire or faintly serrate, 5- to 9- usually 7-nerved from base, petiole long, prehensile; fl. large, over 1 in. diam.; sep. obtuse, densely pubescent outside, spreading at length reflexed; achenes pubescent.

Lower montane zone, rare. Hantane; Alagalla; Ambagamuwa. Fl. Jan.; brownish-yellow outside, dark purple within, stam. white.

Widely distributed in India and Malay Archip. to the Philippines.

A handsome climber, worth cultivation, the leaf-veins and inflorescence are purple.

2. **C. Gouriana,*** *Roxb. Fl. Ind.* ii. 670 (1832).
Thw. Enum. 1. C. P. 680.
Fl. B. Ind. i. 4. Wight, Ic. tt. 933, 934.

A woody climber; branches wide-spreading, pubescent when young; l. pinnate or bipinnate, petiole and rachis elongated, lflts. stalked, unequal, ovate- or lanceolate-oblong, caudate-acuminate, usually deeply but sparingly serrate, glabrous above, pubescent beneath; fl. $\frac{3}{4}$ in. diam.; sep. pubescent; achenes hairy.

Montane zone, 3–6000 ft., rather rare. Ramboda; Dimbula; Nuwara Eliya. Fl. Dec.–Feb.; greenish-white.

Also mountains of Trop. India, Malay Pen., Java, Philippines.

Very like *C. Vitalba*, L., the well-known 'Traveller's Joy' of England.

2. NARAVELIA,† *DC.*

Woody climbers; l. opp., without stip.; infl. axillary, compound; sep. 4, valvate; pet. about 12; fr. as in *Clematis*.—Sp. 2, both in *Fl. B. Ind.*

N. zeylanica, *DC. Syst.* i. 167 (1818); **Nara-wel,** S.
Herm. Mus. 35. Burm. Thes. 36. Fl. Zeyl. n. 226. *Atragene zeylanica*, L. Sp. Pl. 542. Moon Cat. 43. Thw. Enum. 1. C. P. 1009.
Fl. B. Ind. i. 7. Roxb. Cor. Pl. ii. t. 188.

A climbing shrub, branches pubescent; l. long-stalked, 3-foliolate, the central lflt. usually transformed into a tendril which is trifid at the end, lflts. broadly oval, acute, often unequal at base, entire or with a few deep gashes, glabrous above, more or less densely silky-pubescent beneath, 5-nerved; sep. ovate-lanceolate, subacute, pubescent, soon falling; pet. $\frac{1}{2}$–$\frac{3}{4}$ in., rather longer than sep., linear-spathulate, spreading; achenes shortly stalked, acuminate, slightly hairy.

Moist low region, rather rare. Galle; Colombo; Kalutara; Kandy; Lunugala, Uva. Fl. Sept.–Dec.; green.

Also in Trop. India and Malaya.

The tendril is deflexed at right angles with the petiole, and terminates in 3 equal, recurved, rigid, sharp-pointed, hooked branches.

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* Named from the 'ancient city of Gour' in Bengal, near which it is abundant.

† From the Sinhalese name.

3. **ANEMONE,** *L.*

Perennial herbs; fl. large, in a sparingly branched inflorescence, involucrate at base; sep. imbricate, 5–8; pet. 0; stam. numerous; carp. numerous, ovule solitary, pendulous; fruit a head of beaked achenes.—About 80 species; 15 in *Fl. B. Ind.*

A. rivularis, *Ham. in DC. Syst.* i. 211 (1818) *non Wall.*
Thw. Enum. 1. C. P. 1011.
Fl. B. Ind. i. 9. Wight, Ic. 936 (*A. Wightiana*). Hook. Ic. Plant. t. 176 (from Ceylon specimens).

A perennial herb with a woody rootstock clothed with the fibrous remains of former leaves; whole plant more or less hairy; radical leaves very long-stalked, tripartite almost trifoliolate, the segments or lflts. very deeply cut and serrate; fl.-stem erect, 1–3 ft. high; inflor. cymose, trichotomous with erect branches, with a pair of opposite leafy tripartite bracts at the base (involucre) with linear segments, and smaller opposite bracts below the branches; fl. 1½ in. diam.; sep. 5–8 usually 7, slightly silky externally; achenes smooth, beaked, with a hooked tip.

Upper montane zone. Rather rare, but locally abundant as among the grass and bushes of Nuwara Eliya Plain, especially near the stream, and on Horton Plains. Fl. April; white or bluish.

In all the higher mountains of the Indian Peninsula, abundant in the Himalayas.

This pretty plant is the only *Anemone* which extends into the tropics. It can be successfully grown as a hardy perennial in England, and cultivated plants are figured in Bot. Reg., 1842, t. 8.

4. **THALICTRUM,** *L.*

Perennial herbs; fl. small, in a paniculate inflorescence without an involucre; sep. 5, imbricate, petaloid; pet. 0; stam. numerous; carp. numerous, ovule solitary, pendulous; fruit a head of beaked achenes.—Sp. 50; 18 in *Fl. B. Ind.*

T. javanicum, *Bl. Bijd.* 2 (1825).
T. glyptocarpum, W. & A., Thw. Enum. 1. C. P. 2574.
Fl. B. Ind. i. 13. Wight, Ic. t. 48.

A perennial herb, glabrous throughout; stems erect, 2–4 ft. high, slender, smooth, striate, clothed at base with persistent sheaths of petioles of former leaves, often zigzag at the nodes; l. on long petioles with amplexicaul membranous bases, triternate or tripinnate, lflts. on very slender stalks, small, thin, more or less rounded, lobed or coarsely dentate, glau-

cous and veined beneath; panicle small, fls. few; achenes strongly ribbed, beaked with a hooked point.

Upper montane zone; common. Nuwara Eliya; Dimbula; Horton Plains; &c. Fl. Jan.–April; white.

On all the higher mountains of India and Java.

5. **RANUNCULUS**, *L.*

Perennial herbs; l. few or solitary; sep. 5, imbricate, caducous; pet. 5, spreading; stam. numerous; carp. numerous, ovule solitary, erect; fruit a head of beaked achenes.—Sp. about 160; 21 in *Fl. B. Ind.*

Leaves not divided. . . . . . . 1. R. SAGITTIFOLIUS.
Leaves much divided. . . . . . . 2. R. WALLICHIANUS.

1. **R. sagittifolius,** *Hook. Ic. Plant. t.* 173 (1837).

R. hastatus, Walker in Wight, Ill. i. 5. Thw. Enum. 1. C. P. 520.
Fl. B. Ind. i. 17. Hook. Ic. (from a Ceylon specimen).

A perennial herb with a horizontal or ascending rootstock; l. mostly radical on very long hairy petioles, cordate-oblong, obtuse, base strongly sagittate with rounded lobes, crenate, glabrous above, hairy on the veins beneath; flowering stem erect, 2–3 ft. high, smooth, branched; cauline leaves few, oblong or linear, inciso-dentate; fl. $\frac{3}{4}$ in. diam.; pet. 5, nearly orbicular; carpels in a globose head, smooth, keeled on the back, with a short incurved beak.

Upper montane zone, in wet or marshy places, common, especially at Horton Plains and N. Eliya. Fl. May, June, Sept.; bright yellow.

Endemic.

This is the 'Buttercup' of the hills.

2. **R. Wallichianus,** *W. & A. Prod.* i. 4 (1834).

R. zeylanicus, Moon Cat. 43 (?) *R. pinnatus*, Arn. Pug. 4. Thw. Enum. 1. C. P. 1012.
Fl. B. Ind. i. 20. Wight, Ic. t. 937.

A perennial stoloniferous herb, rooting at the nodes of the long prostrate branches; l. on long hairy petioles ternatisect or nearly trifoliolate, the segments or lflts. tripartite, deeply cut or toothed at the ends, with long silky hairs on both surfaces; fl. solitary on long hairy peduncles opposite the leaves, small, $\frac{1}{3}$–$\frac{1}{2}$ in. wide; sep. reflexed; pet. broadly oval; achenes few, much flattened on the sides, margined, glabrous, the sides usually tuberculated, but sometimes quite smooth, terminating in a short hooked beak.

Damp shady places in upper montane zone; common. Horton Plains; Pedurutalagala; Haputale; Nuwara Eliya; Ella, Uva. Fl. April–September; yellow, inconspicuous.

Also in the Nilgiri Hills of S. India.

I suppose this to be Moon's *R. zeylanicus* which he collected in Uva; but I have seen no specimens from him.

II.—DILLENIACEÆ.

TREES, shrubs, sometimes climbing, or perennial herbs. L. alternate or radical, simple (rarely compound in *Acrotrema*), without stip. or with stip. fused with petiole; fl. regular, bisexual; sep. 5, imbricate, persistent; pet. 5 (rarely 4), usually showy, yellow or white; stam. numerous (15–indef.), distinct or monadelphous or in 3 bundles, anth. innate; carp. few (2–5) or many, rarely solitary, distinct or slightly coherent in axis, styles distinct, ovules few or many; fruit-carp. distinct, dehiscent (follicles) or indehiscent; seeds solitary or numerous, surrounded by an aril (absent in *Dillenia*), embryo minute in fleshy endosperm.

Filaments dilated upwards, anther-cells separated (*Delimeæ*).
  Carpel solitary . . . . 1. DELIMA.
  Carpels 2–5 . . . . 2. TETRACERA.
Filaments not dilated upwards (*Dillenieæ*)
  Carpels 3; anth. opening by slits.
    Perennial herbs . . . . 3. ACROTREMA.
    Shrubs . . . . 4. SCHUMACHERIA.
  Carpels 4–20; anth. opening by terminal pores (trees)
    Seeds arillate . . . . 5. WORMIA.
    Seeds without an aril . . . . . . 6. DILLENIA.

The species are nearly all found only in the low country of the moist region.

1. DELIMA,* *L.*

A woody climber; sep. 5; pet. 3–5; anther-cells separated by wide connective; carp. solitary, ovules 2–5, ascending; fr. a follicle; seed solitary, surrounded at base by a large lacerate aril.—Monotypic.

D. sarmentosa, *L. Sp. Pl. ed.* 2, *p.* 736 (1762). **Korasa-wel,** S.
Herm. Mus. 19. Burm. Thes. 101. Fl. Zeyl. n. 205. Moon Cat. 42. Thw. Enum. 2. C. P. 1015.
Fl. B. Ind. i. 31 (not given for Ceylon). Burm. Fl. Ind. t. 37, f. 1. Bot. Mag. t. 3058.

A large climber, stems thick, woody, with rough red bark, green parts hispid-scabrous; l. 3–6 in. long, stalked, oval or broad oval, obtuse or acute, entire or slightly toothed at

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* From *delimare*, to polish or smooth, from the use made of the rough leaves; the native name has the same meaning.

upper part, rigid, strongly ribbed with numerous parallel lateral veins extending to the margin; scabrous especially above; inflor. paniculate, terminal and from upper leaf axils; fl. numerous, small, $\frac{1}{4}$–$\frac{1}{2}$ in. diam.; sep. unequal, rounded, obtuse, ciliate and pilose; pet. usually 4, spreading or reflexed; stam. very numerous, filaments long, gradually dilated upwards; carp. solitary, style long apiculate; ovary 1-celled, with 3 or 4 ovules; follicle ovoid, $\frac{1}{3}$–$\frac{1}{2}$ in. long, tapering into a sharp beak; pericarp thin, smooth and shining, surrounded at base by persistent sep.; seed globose, compressed, black, with a fimbriate aril.

Rather common in the low country of the moist region—Heneratgoda; Ratnapura; Kalutara; Ambagamuwa. Rarer in the dry region—Kurunegala; Puttalam. Fl. March–June; white.

From Eastern Bengal to Singapore, the Malay Islands, the Philippines, and S. China; not in Peninsular India.

2. TETRACERA, *L.*

A woody climber; sep. and pet. 4–6; anther-cells widely separated; carp. 3–5, ovules numerous; follicles 2–5, each with 1–3 seeds; seeds surrounded by a toothed aril.—Species 24; 4 in Fl. B. Ind.

T. lævis, *Vahl, Symb.* iii. 71 (1794). **Ét-korasa-wel,** S.
Hk. f. and Th. Fl. Ind. 62. Thw. Enum. 2. C. P. 1016.
Fl. B. Ind. i. 31. Wight, Ic. t. 70 (*T. Rheedei*) (not good).

A woody climber with smooth flexuose branches, glabrous throughout; l. very shortly stalked, 3–5 in., oblong-oval, tapering at base, caudate-acuminate and often twisted at apex, entire or distantly denticulate, lat. veins parallel, curved, prominent; fl. 1 in. diam., in small terminal panicles; sep. large, broadly oval, rounded, persistent, silky in centre within; pet. caducous; stam. very numerous, persistent; carp. 3–5, styles long; follicles beaked, smooth, brown, surrounded by persistent cal. and stam.; seeds 2 or 3.

Low country, rare. Kalutara; Puttalam. Fl. Aug. Sept.; white.
Also in Malabar, Java, and Borneo.
I have not seen living specimens.

3. ACROTREMA, *Jack.*

Perennial herbs with an ascending or horizontal rootstock; l. all radical with broad sheathing bases (adherent stip.) and the lateral veins parallel; infl. in axillary racemes, with a usually short peduncle and long pedicels which look like radical

peduncles, bracts large, membranous; fl. yellow; sep. and pet. 5; stam. 15–50, usually in 3 bundles; carp. 3, slightly coherent in centre, ov. with 2–indef. ovules, styles subulate, recurved; follicles bursting irregularly; seeds with a crustaceous, pitted testa, surrounded by a white aril.—Sp. about 10, all in *Fl. B. Ind.*

Racemes with short peduncles.
  Leaves not pinnate or pinnatisect, or only so at the very base.
    Leaves obovate-oblong, obtuse . . . . 1. A. UNIFLORUM.
    Leaves lanceolate-oblong, acute . . . . 2. A. INTERMEDIUM.
    Leaves linear-lanceolate, large . . . . 3. A. LANCEOLATUM.
    Leaves linear-oblong, small . . . . . 4. A. GARDNERI.
  Leaves pinnate or pinnatisect throughout.
    Leaflets or segments oblong, equal . . 5. A. THWAITERII.
    Leaflets or segments linear, unequal . . 6. A. DISSECTUM.
Racemes with long peduncles . . . . . 7. A. LYRATUM.

The only herbaceous genus in the family.

All the Ceylon species are endemic. Besides them, there is also a species endemic in Malabar, and another (the first known) in the Malay Peninsula.

Most of the species are ill-defined and extremely variable, and I have failed to obtain any clear idea of their limits. They doubtless hybridise freely.

They are very pretty little plants, growing in damp mossy places, the crevices of rocks and shady woods; their habit rather reminding one of the common English primrose, but the flowers more like Potentilla.

All are confined to the low country of the moist region; one species only extending into the lower montane zone.

1. **A. uniflorum,** *Hook. Ic. Pl.* ii. t. 157 (1837). **Bin-béru,** S.
Hk. f. and Th. Fl. Ind. 64. Thw. Enum. 2.
Fl. B. Ind. i. 33 (including *A. Walkeri*). Hook. Ic. Pl. t. 157.

L. usually obovate-oblong, broad or narrow, usually obtuse at apex and narrowed or attenuate towards base, the actual base being generally cordate or auriculate, usually crenate-dentate, rarely entire, sometimes deeply cut or even compound with separate lflts. at base, glabrous or pilose or hairy or scabrid above and beneath, the veins always hairy, often rugose or bullate; fl. 1–8 in the raceme; stam. 15–50.

Extremely variable, almost every district producing a local form; the following named varieties are completely connected by intermediates, and might be indefinitely extended.

Var. α. *petiolare*, Thw. Enum. 2. C. P. 265, 3882 (*coloratum*, Thw. MS.), 3896 (*minus* Thw. MS.) L. narrow, usually on long petioles, glabrous above; stam. about 30.

Var. β. *rotundatum*, Thw. Enum. 2. C. P. 1014, 3486 (a small form). L. broad, shortly petiolate, often nearly entire.

Var. γ. *bullatum*, Hk. f. and Th. *A. bullatum*, Thw. Enum. 2. C. P. 239. Lves. very bullate above, and excavated between the veins beneath, softly pubescent; stam. about 20.

Var. δ. *rugatum*, Thw. MS. (sp.). C. P. 3899, 3905 (a large villous form). L. bullate above, hispid or villous, ped. and cal. very villous.

Var. ε. *sylvaticum*, Hk. f. and Th. *A. sylvaticum*, Thw. Enum. 2. C. P. 2659. L. large, membranous, pilose.

Var. ζ. *Walkeri*, Trim. *A. Walkeri*, Wight in Thw. Enum. 3. C. P. 694, 3831 (var. *argyroneurum*, Thw. Enum. 398) Bot. Mag. t. 5353 (poor specimen). L. laxly hairy on both sides, often bullate, frequently variegated with white along the veins; raceme short; stam. 15–24.

Var. η. *membranaceum*, Thw. MS. (sp.). C. P. 3897 (several forms), 3898 (var. *villosulum*, Thw. MS.). L. large, serrate-dentate, usually auriculate at base, finely pilose-hispid above.

Var. θ. *appendiculatum*, Thw. MS. (sp.). C. P. 3880. L. with 2 or 3 pairs of deeply incised often stalked leaflets at base, very bullate above, the bullæ slightly rough with prickly hairs; stam. 50. Probably a hybrid.

Var. ι. *dentatum*, Thw. MS. (sp.). C. P. 3881. L. coarsely crenate-dentate in upper part, teeth becoming larger and deeper downwards, forming at the base 1 or 2 pairs of separate leaflets; racemes short, distinctly stalked, fls. 6 or 7; stam. 27. This may be a distinct species, but is more probably a hybrid.

Moist low country, and extending up to 4000 ft. on shady and rocky banks, rather common. Var. θ, Kitulgala; Var. ι, Morowak Korale. Fl. Feb. to April, and Aug. and September.

Endemic.

The name *uniflorum* is unfortunate, as there are nearly always more than one fl. in the raceme. The original figure represents a weak, unhealthy plant with very few and small flowers, and with only 5 or 10 stam., a form I have never met with.

2. **A. intermedium,** *Thw. Enum.* 3 (1858).
C. P. 3114.
Fl. B. Ind. i. 33.

Rootstock elongated; l. large, 4–12 in., obovate-lanceolate, acute, much attenuate below, the actual base auriculate, strongly serrate, more or less hairy chiefly on the veins beneath and between them above; fl. numerous, rather large; ped. and cal. coarsely hairy; stam. about 40.

Moist low country; rare. Kitulgala; Ambagamuwa. Fl. Jan–March
Endemic.
This may be merely another form of *A. uniflorum.*

3. **A. lanceolatum,** *Hook. Ic. Plant. sub t.* 157 (1837).
Hk. f. and Th. Fl. Ind. 65. Thw. Enum. 3. C. P. 2660.
Fl. B. Ind. i. 33.

Rootstock short; l. large, linear-lanceolate, acute, coarsely sinuate-serrate, nearly glabrous above, hairy on the veins beneath; racemes erect, fl. few, ped. with spreading hairs; stam. about 40.

Moist low country; rare. Adam's Peak (Walker); near Kitulgala. Fl. March.

Endemic.

4. **A. Gardneri,** *Thw. Enum.* 3 (1858).
C. P. 253.
Fl. B. Ind. i. 33.

Rootstock erect, slender; l. small, 2–3½ in. long, linear-oblong or linear-spathulate, acute, rounded at base, spinous-denticulate, glabrous above, adpressed-hairy on veins beneath; ped. with adpressed hairs; stam. 15–20.

Moist low country by streams; rather rare. Adam's Peak; Ratnapura; Singhe Raja Forest, in several places, abundant. Fl. March, April.
Endemic.

This has the appearance of a quite distinct species, though its characters are hard to define.

5. **A. Thwaitesii,** *Hk. f. and Th. in Kew Journ. Bot.* viii. 241 (1856).
Thw. Enum. 3. C. P. 3364, 3969.
Fl. B. Ind. i. 34. Kew J. Bot. l.c., t. iv. A.

L. pinnatisect or pinnate, linear-lanceolate in outline, the segments or leaflets oblong, usually serrate-dentate, hairy on both sides, petioles very short; pedicels long, hairy; stam. 15–25, evenly arranged (not in 3 groups).

Moist low country; very rare. Dolosbagie District only. Fl. Feb. March.
Endemic.

C. P. 3969 (var. *stolonifera*, Thw. MS.) is a curious form with long trailing runners rooting at the nodes. There are specimens under C. P. 3364 which appear to be hybrids with some form of *A. uniflorum*, the leaves being deeply cut at the lower part only.

6. **A. dissectum,** *Thw. in Kew Journ. Bot.* viii. 242 (1856).
Thw. Enum. 3. C. P. 3393.
Fl. B. Ind. i. 34. Kew Journ. Bot. l. c. t. iv. B.

L. deeply pinnatisect or pinnate, lanceolate in outline, acute; rachis stout, segments or leaflets very unequal, silky beneath, the larger ones again pinnatisect with linear, unequal, bristle-pointed segments, the smaller ones linear, entire; peduncle short; stam. about 30.

Moist low country; very rare; only collected at Hewesse, Pasdun Korale; and in Hiniduma Pattu. Fl. April.
Endemic.

The plant at Hiniduma was growing along with *A. uniflorum*, var. *sylvaticum*, and many of the specimens are believed by Thwaites to be hybrids between the two species, the various forms of the leaves making a complete connecting chain.

7. **A. lyratum,** *Thw. in Kew Journ. Bot.* viii. 242 (1856). [PLATE I.]
Thw. Enum. 3. C. P. 3392.
Fl. B. Ind. i. 34.

Rootstock very stout, ascending; l. erect, large, 8–10 in. long, coriaceous, glabrous, lyrate-pinnatisect, the terminal lobe very large, obtuse, cordate at base, denticulate, the lower lobes in 4 or 5 pairs, deflexed, rounded, with a few sharp prickly teeth, petiole broadly winged; raceme erect, peduncle

6–10 in. high, pedicels long, spreading, fl. large $\frac{3}{4}$ in. diam.; stam. about 20.

Moist low country; very rare. Only known from the top of Nillowe Kande, an isolated precipitous rock in Hiniduma Pattu. Fl. April–May.

Endemic.

A very striking and distinct species. The inflorescence and under-surface of leaves are purple.

4. SCHUMACHERIA,* *Vahl.*

Erect or scrambling shrubs, with flexuose branches; l. with a sheathing, broad-based petiole, coriaceous, with strong lateral veins; fl. in panicles, sessile, with 2 bracts at the base, yellow; sep. and pet. 5; stam. numerous, in 2 or 3 rows, monadelphous, the filaments forming a semicylindrical column at the back of the fl.; carp. 3, distinct, ov. densely hairy, 1-ovuled, style long, curved; fruit indehiscent; seed with a crustaceous testa, surrounded at base by a small membranous aril.—Confined to Ceylon; the 3 species closely allied.

Panicles terminal, large . . . . . 1. S. CASTANEÆFOLIA.
Panicles axillary, small.
  Leaves broadly oval or rotundate . . 2. S. ALNIFOLIA.
  Leaves lanceolate-oblong . . . . 3. S. ANGUSTIFOLIA.

1. **S. castaneæfolia,** *Vahl in Skrivt. Nat. Selsk. Kiob.* vi. 122 (1810). **Kekiri-wara,** S.

Arn. in Edinb. New Phil. Journ. xvi. 315. Wight, Ill. i. 9. Thw. Enum. 4. C. P. 232.

Fl. B. Ind. i. 35. Wight, Ill. i. t. 4.

A large, straggling shrub; l. 6–8 in. long, broadly oval or ovate-oval, obtuse or suddenly acute, sinuate-dentate, glabrous above, puberulous on veins beneath; fl. numerous, sessile, $\frac{3}{4}$ in. diam., secund, in large terminal spreading panicles; bracts and sep. silky on both sides.

Moist low country below 1000 ft.; common. Galle; Pasdun Korale; Nillowe, S. Prov.; Sabaragamuwa very common; Labugama. Fl. Jan.–April; yellow.

Endemic.

First collected by Koenig. The fl. vary in size; there are often only 4 petals.

2. **S. alnifolia,** *Hk. f. and Th. Fl. Ind.* 66 (1855).

Thw. Enum 4. C. P. 9.

Fl. Brit. Ind. i. 34.

An erect shrub, branches stout, divaricate; l. 4–6 in., broadly oval or nearly rotund, very obtuse, repando-denticu-

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* Commemorates C. F. Schumacher, Professor of Surgery at Copenhagen in 1810.

late, glabrous above, scabrous-pubescent beneath, petioles short, stout, deeply channelled; fl. ½ in. diam., in small, axillary, stalked panicles much shorter than the leaves; branches few, silky; stam. about 20.

Var. β. *dentata*, Wight in Thw. Enum 4. C. P. 339.

Petioles hairy, leaves coarsely serrate-dentate, more hairy beneath, and with more prominent reticulate venation.

Var. γ. *subglabra*, Thw. Enum. 4. C. P. 2416.

Leaves nearly glabrous beneath.

Lower Montane zone; rather common. Ambagamuwa; Adam's Peak. Var. β Adam's Peak; Hunasgiriya. Var γ Hunasgiriya. Fl. Jan–April; yellow.

Endemic.

The varieties are scarcely worth separate names.

3. **S. angustifolia,** *Hk. f. and Th., Fl. Ind.* 66 (1855). [PLATE II.] Thw. Enum. 4. C. P. 2992.

Fl. Br. Ind. i. 34.

An erect shrub, branches cylindrical, smooth, young buds white, silky; l. 4–6 in., shortly stalked, lanceolate-oblong, acuminate, serrate, glabrous except on midrib beneath; fl. ⅓ in. diam., arranged as in 2; sep. very silky externally; stam. about 27.

Moist region, below 2000 ft.; rare. Hiniduma and Kukul Korale, abundant.

Fl. December, April, June; yellow.

Endemic.

5. **WORMIA,** *Rottb.*

Trees; petioles with an adherent stipular wing; sep. 5, persistent, much and unequally enlarged and loosely enclosing the ripe fruit; pet. 5, large; stam. indef., anth. opening by 2 terminal pores; carp. 4–5, each with several ovules in 2 rows; fruit-carp. indehiscent, each 1–2-seeded; seed with a fleshy aril.—Species 9, 4 in *Fl. B. Ind.*

W. triquetra, *Rottb. in Nov. Act. Hafn.* ii. 532 (1783). **Diya-para,** S. [PLATE III.]

Dillenia dentata, Thunb. in Trans. Linn. Soc. i. 201. *Dillenia aquatica*, Moon Cat. 42. Hk. f. and Th. Fl. Ind. 67. Thw. Enum. 4. C. P. 1013.

Fl. Br. Ind. i. 35. Trans. Linn. Soc. i. t. 20.

A moderate-sized tree, twigs smooth, brown, marked with large leaf-scars; petioles long, channelled above, half-surrounded at the base by a prominent, fleshy, horse-shoe-shaped cushion, and at first provided with long, narrow, herbaceous

stipules, which are adherent to the margins of its upper surface, and united by their other edge so as to form a narrow tube in which the terminal bud is enclosed; leaf-blade 6–7 in. long, broadly oblong-oval, obtuse or bluntly apiculate, coarsely repand-serrate, coriaceous, glabrous on both sides; fl. few, large, 2½ in. diam., secund, in small racemes opp. the leaves; sep. very obtuse, very strongly imbricate, fleshy, persistent; stam. in several series, nearly equal, persistent; ov. with about 8 ovules, styles subulate, persistent; fruit small, nearly globular, surrounded at base by withered stam. and loosely enclosed in the enlarged, unequal, obovate-oblong, thick but not fleshy persistent sep., composed of 4 or 5 free but closely approximate carp.; pericarp thin, membranous.

Moist low region, ascending to its upper limit, in damp ground; rather rare. Ambagamuwa; Pusselawa; Colombo; Kurawita Korale. Fl. Dec.-Jan.; white, stamens yellow.

Endemic.

The bud is completely enclosed in the tube formed by the petiolar stipules the margins of which are united; these shrivel and fall away after the full expansion of the leaf.

Koenig's original specimens in Mus. Brit. are labelled by him 'Reaumuria orbiculata,' an unpublished name.

Wood reddish, close-grained, moderately hard.

6. **DILLENIA,** *L.*

Trees; l. large, coriaceous, with strong parallel lateral veins ending at the margin in spinous teeth; fl. large, solitary or few; sep. 5, thick, persistent, and ultimately much enlarged and closely investing the fruit; pet. 5; stam. very numerous, in many series, anth. opening by small pores; carp. 5–20, ovules numerous; fruit globular, indehiscent, the carp. free but closely approximate, so as to appear syncarpous; seeds numerous in each cell, no aril.—Sp. 12; all in *Fl. B. Ind.*

Leaves acute. Fl. 6 in. diam. Fruit 5–6 in. diam. . 1. D. INDICA.
Leaves very obtuse. Fl. 3 in. diam. Fruit 1½ in. diam. 2. D. RETUSA.

1. **D. indica,** *L. Sp. Pl.* 535 (1753). **Hondapara, Wampara,** S.
Herm. Mus. 70. Moon Cat. 42. *D. speciosa*, Thunb., Thw. Enum. 5. C. P. 2961.
Fl. B. Ind. i. 36. Wight, Ic. t. 823.

A moderate-sized round-headed tree, bark cinnamon brown; l. closely placed, very large, 10–12 in. long, oblong-lanceolate, acute, sharply serrate, glabrous above, finely pubescent on veins beneath, lateral veins numerous, strong;

petioles $1\frac{1}{2}$ in. long, stout, deeply channelled above, pulvinate at base; fl. very large, 6–7 in. diam., on stout subterminal ped.; sep. very fleshy; pet. orbicular with a broad base; stam. persistent; carp. 15–20, coherent at the axis, styles spreading like a star, white; ripe carp. enclosed in the greatly enlarged and thickened sep., which are 1 in. thick and strongly imbricate, the whole forming a large green globose pomiform fruit 5–6 in. diam., actual fruit $2\frac{1}{2}$ in. diam., pericarp thin, indehiscent; seeds numerous, compressed, with a hairy margin.

Low country up to 2000 ft.; common, often planted. Fl. July, August; white, stamens yellow; fruit green.

Throughout India and the Malay Peninsula and Islands.

A very handsome tree with fine foliage, magnificent flowers, and remarkable apple-like fruit. It is much planted for ornament. The fruit gives a lather with water, and is used as soap.

2. **D. retusa,** *Thunb. in Trans. Linn. Soc.* i. 200 (1791). **Godapara**, S.

Herm. Mus. 49. *D. integra*, Thunb. l. c. 199. Moon Cat. 42. *Wormia retusa*, Hk. f. and Th. Fl. Ind. 68. Thw. Enum. 5. C. P. 2960.

Fl. B. Ind. i. 37. Trans. Linn. Soc. l. c. t. 19, and t. 18 (*D. integra*).

A moderate-sized tree, bark brownish-grey; l. large, 6–12 in., obovate-oblong, very obtuse, gradually tapering to base, shallowly repand-serrate, stiff, coriaceous, glabrous and shining on both surfaces, petiole 1 in., channelled, pubescent, pulvinate; fl. large, 3 in. diam., on long, pubescent, subterminal or leaf-opposed ped., often 2-fld.; sep. fleshy, persistent; pet. rotund, with a narrow base; stam. all erect; carp. 5, coherent at the axis, styles subulate, ovules numerous; ripe carp. enclosed in much enlarged and thickened imbricate sep. forming a depressed-globose, very finely pubescent, orange fruit, $1–1\frac{1}{2}$ in. diam., actual fruit $\frac{1}{2}–\frac{3}{4}$ in., pericarp thin, fleshy; seeds several, smooth.

Moist low country; rather common. Fl. May, June, August; white; stam. pink or purple; fruit orange.

Endemic.

The leaves vary a good deal in size, width, and margin. Thunberg's *D. integra* is apparently an entire-leaved form, but his figures are very poor.

Wood reddish-brown, fine-grained, moderately hard, durable, medullary rays distinct.

III.—MAGNOLIACEÆ.

TREES or climbing shrubs; l. alternate, simple, entire, with or without stip.; fl. regular, bi- or unisexual; sep. and pet. not distinguished, 9–12, imbricate in several series; stam. indef., distinct or monadelphous; carp. indef., distinct, imbricated, each with 2–4 ovules; ripe carp. dehiscent (follicles) or indehiscent, 1–4-seeded; seeds with a minute embryo in copious endosperm.

Tree. Leaves stipulate (*Magnolieæ*) . . . . . 1. MICHELIA.
Climbing shrub. Leaves exstipulate (*Schizandreæ*). . 2. KADSURA.

1. **MICHELIA**, *L.*

Trees, l. with stip.; perianth-leaves 9–12 in several series, imbricate; stam. numerous, distinct; carp. numerous, in a spike, supported on a gynophore; fruit a spike of follicles, each dorsally dehiscent and 1- or 2-seeded.—Sp. 12; 8 in *Fl. B. Ind.*

M. nilagirica, *Zenk. Pl. Ind.* 21 (1835) **Wal-sapu**, *S.*
M. Walkerii and *M. glauca*, Wight, Ill. i. 13, 14. Thw. Enum. 5. C. P. 576, 141 (part).
Fl. B. Ind. i. 44. Zenk. Pl. Ind. t. 20. Ann. Bot. Gard. Calc. iii. t. 65.

A moderate-sized or large tree, much branched, with a rounded head, bark rather smooth, thick, grey, twigs flexuose, irregular, young parts silky; l. on short slender petioles, 3–3½ in., lanceolate or oval-lanceolate, tapering at both ends, shortly and bluntly acuminate, entire, with a narrow horny margin, glabrous and bright green above, glaucous or white with a very fine silky pubescence beneath (when young very silky), stip. intrapetiolar, densely silky, shining, connate and completely enclosing the bud, quickly deciduous leaving a ring-scar; fl. solitary, terminating short lateral twigs, 1¾–2 in. diam., peduncle short, stout, silky; perianth-leaves usually 12, obovate-strap-shaped, the inner narrower; connective prolonged beyond the anther-cells into a tongue-like appendage: gynophore shorter than the stam.; carp. silky, ovules 2 or 3, superposed; fruit an irregular spike of follicles elevated on the much-enlarged gynophore, mixed with many abortive carpels, each follicle ovoid, bluntly apiculate, pale yellow tinged with purple, spotted with small distant worts, dehiscing dorsally into 2 leathery valves; seeds 2 or 1, roundish or

flattened on one side, outer coat thick, pulpy, bright scarlet outside, inner coat thin, hard, black, shallowly grooved.

Var. β. *ovalifolia*, Thw. *M. ovalifolia*, Wight, Ill. i. 13.
Var. *Walkeri*, Thw. (in part). Var. *Wightii*, Hk. f. and Th., Fl. B. Ind. i. 44. C. P. 141 (chiefly), 2636.

Leaves larger, 3½–4½ in. long, broadly oval, abruptly or gradually acuminate, not glaucous beneath; perianth-leaves usually 9.

Montane zone, in forests above 5000 ft. common; and down to 4000 ft. more rarely. Var. β. Adam's Peak District; Horton Plains. Fl. March, April; pale sulphur-yellow, sweet-scented, becoming darker when withering.

Also in Nilgiri Mts., S. India.

The above description of our type is taken from the common form in the hills; it does not quite agree with that of any of the three species given for Ceylon by Wight, but is nearest to his *M. Walkerii.* The Nilgiri tree seems to differ considerably; Zenker's figure shows white flowers with 8 perianth-leaves, and Wight, Ic. t. 398, has much larger flowers than any of our forms.

Var. β. looks distinct enough, but is connected with the type by intermediate forms. C. P. 2636 might be distinguished as another variety; it has longer tapering leaves almost caudate at the apex and larger flowers with 9 or 12 per.-leaves; it seems near *M. pulneyensis*, Wight, Ill. t. 5, but was called var. *Walkeri* by Thwaites.

There are specimens of var. β. from Moon (in Mus. Brit.) collected between Palabadulla and Gilimale below Adam's Peak, quite out of the montane zone. These may probably represent the *Liriodendrum liliifera* of Moon Cat. 43 from 'Saffragam,' for which he gives the native name, 'Halu-hulla.' But Linnæus' *L. liliifera* was based on a figure of Rumph (Herb. Amb. ii. t. 69) which appears to represent a species of *Talauma*, a genus not met with in Ceylon.

One of the best of the mountain timbers. Wood pale-brown, often somewhat greenish, fine-grained, strong and very durable. One sort is often called by carpenters 'Wal-buruta,' and distinguished from the ordinary 'Wal-sapu' by darker colour and greater weight. The 'Buruta' wood used for sleepers on the Nanu-oya Railway (see Vincent's Forest Report, par. 452 and note) was this, and not satin-wood.

M. Champaca, L. (C. P. 1023) is the well-known 'Sapu,' 'Hapu' or 'Champak' tree, much cultivated in Ceylon, but nowhere native. It is considered wild in many parts of India and in Java, and is doubtless a very ancient introduction here. There are specimens in Hermann's Herbarium, and it is recorded in his Mus. Zeylan. p. 64 as 'Hapughaha.' The very fragrant yellow flowers are produced in May, and much used for temple offerings. They are quickly followed by the fruit, which contains several somewhat angular seeds extremely like fragments of pink coral. The tree is well figured in Pierre's magnificent 'Flore Forestière' of Cochin China, t. 3.

2. **KADSURA,*** *Kaempf.*

Climbing shrubs, l. exstipulate ; fl. unisexual ; perianth-leaves 9–12, in 3 series, imbricate ; stam. numerous, with dilated filaments ; carp. numerous ; fruit a globose head of fleshy, indehiscent, 1–4 seeded carpels.—Sp. 7 ; 2 in *Fl. B. Ind.*

K. Wightiana, *Arn. in Jard. Mag. Zool. and Bot.* ii. 546 (1838). Hk. f. and Th. Fl. Ind. 84. Thw. Enum. 5. C. P. 1028. Fl. B. Ind. i. 45. Ann. Bot. Gard. Calc. iii. t. 74 B. (poor).

A climbing shrub, bark reddish ; l. alternate, closely placed, 2–4 in. long, shortly stalked, oval, acute or acuminate, tapering into petiole, entire or nearly so, glabrous, purple when young ; fl. unisexual, monœcious, peduncles axillary or fasciculate at base of short lateral branchlets ; perianth-leaves about 12 in three series, strongly imbricate, broadly oval, narrower in ♂ fl. ; stam. 30 or more, forming a globose or ovoid head, filaments free, much thickened and fleshy, anther-cells distant ; carp. numerous, densely imbricated in an ovoid head, ovules 3–5 usually 4, stigma large, white ; fruit a globose head, 2 in. or more wide, composed of about 20 distinct, fleshy, pear-shaped carp. varying in size, quite smooth, strongly marked along one side with the linear scar of the stigma, pale yellow tinged with orange ; seeds 1–4, kidney-shaped, compressed, albumen equable, white.

Montane zone, and descending to 2000 ft., in forests ; rather rare. Hakgala ; Pusselawa ; Hantane ; Ambagamuwa. Fl. Aug. ; yellowish green.

Also in Malabar.

The old stems often develop thick prominent wings of soft cork.

IV.—ANONACEÆ.

TREES or shrubs, sometimes scandent. L. alternate, simple, entire, without stip. ; fl. regular, bisexual ; sep. 3, distinct or more or less connate, generally valvate ; pet. 6, in 2 rows, distinct, or the inner row connate ; stam. usually indef., rarely def., crowded on recept., fil. very short or none, anth. adnate,

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* *Kadsura* is the Japanese name for *K. japonica*, L.

connective prolonged beyond anth.; carp. numerous or few, distinct, very rarely solitary, ovules 1 to numerous; ripe carp. often stalked, indehiscent (very rarely follicular), few- or 1-seeded; seeds large, embryo small, in copious ruminated endosperm.

The genera are difficult of definition, and good flowering and fruiting specimens are required to identify the plants.

Stam. indefinite (over 30), anther-cells concealed by the connectives.
- One or both rows of pet. imbricate . . . 1. UVARIA.
- Both rows of pet. valvate.
  - Pet. similar, or inner row smaller.
    - Inner row of pet. coherent at concave bases.
      - Tree; no hooked peduncles . . 2. CYATHOCALYX.
      - Climbing by hooked peduncles . . 3. ARTABOTRYS.
    - All pet. flat or slightly concave.
      - Carp. indehiscent.
        - Ovules 2–6. Seeds 1–3 . . . 4. UNONA.
        - Ovules 1 or 2. Seed solitary . . 5. POLYALTHIA.
      - Carp. dehiscent . . . . . . 6. ANAXAGOREA.
    - Inner row of pet. connivent (not coherent at concave bases) . . . . . 7. XYLOPIA.
  - Pet. dissimilar, inner row coherent into a cone.
    - Carp. generally 1-seeded . . . 8. GONIOTHALAMUS.
    - Carp. 2–3-seeded . . . . . . 9. MITREPHORA.

Stam. definite (6–30), anther-cells not concealed.
- One or both rows of pet. imbricate . . . 10. BOCAGEA.
- Both rows of pet. valvate.
  - Inner row of pet. much larger.
    - Stam. 20–30 . . . . 11. MILIUSA.
    - Stam. 6 . . . . 12. OROPHEA.
  - Pet. all equal . . . . 13. ALPHONSEA.

A completely tropical family. Of the 39 Ceylon species by far the greater number (32) inhabit the moist low region, and 23 are confined to it, whilst 6 others extend upwards into the lower montane zone, which has also two species, *Anaxagorea* and *Bocagea coriacea*, restricted to it. None reach the upper montane zone. In the dry region 9 species are found, 5 confined to its bounds, and 4 also found in the moist region.

A large proportion, no less than 18, of our species are endemic, but we have no endemic genus. These for the most part show Malayan rather than Peninsular-Indian affinities.

1. UVARIA, *L.*

Climbing or straggling shrubs; fl. solitary or in few-fld. inflor., terminal or leaf-opposed; sep. usually combined into a cup-shaped calyx; pet. in 2 rows, 1 or both rows imbricate, or all connate at base; stam. indef., cuneate or nearly truncate; carp. indef.; ov. linear, with numerous ovules in 1 or 2 rows,

stigma broad, sessile; fruit-head of many usually stalked carp., fleshy or dry, few- or several-seeded.—Sp. about 35; 19 in *Fl. B. Ind.*

Outer stam. subfoliaceous, flat.
  Ripe carp. sessile or nearly so . . . . 1. U. SPHENOCARPA.
  Ripe carp. stalked, smooth . . . . . 2. U. MACROPHYLLA.
  Ripe carp. long-stalked, tomentose . . 3. U. SEMECARPIFOLIA.
Stam. all similar.
  Ripe carp. linear-oblong on very long stalks . 4. U. MACROPODA.
  Ripe carp. ovoid, smooth, scarlet . . . 5. U. NARUM.
  Ripe carp. ovoid, pubescent, yellowish . 6. U. ZEYLANICA.

1. **U. sphenocarpa,** *Hk. f. and Th. Fl. Ind.* 99 (1855).
Thw. Enum. 6. C. P. 1045.
Fl. B. Ind. i. 48. Beddome Ic. t. 80.

A straggling shrub, young shoots fulvous-tomentose with stellate hairs; l. shortly stalked, oblong-oval, tapering, acuminate, rounded at base, glabrous above, stellate-tomentose beneath; fl. solitary, ped. leaf-opposed, bracts several, small, rotundate; cal. cup-shaped, truncate, densely fulvous-tomentose; pet. ovate, acute, spreading, finely tomentose on both sides; ripe carp. ¾ in. or more long, sessile, cuneate-obovate, deeply grooved and worted, densely fulvous-tomentose.

Low country up to about 1500 ft.; in both dry and moist regions rather rare. Haragama; Sigiri; Galagama; Mawarelle, S. Prov. Fl. July; pale yellow.

Endemic.

2. **U. macrophylla,** *Roxb. Fl. Ind.* ii. 663 (1832).
Thw. Enum. 6. C. P. 3527.
Fl. B. Ind. i. 49. Bedd. Ic. t. 81.

A large woody climber, shoots with dense fulvous stellate tomentum; l. large, 6–8 in. long, petioled, broadly oval or obovate, abruptly acuminate entire, sparsely stellate-hairy above, densely stellate-pubescent beneath; ped. 2–5-fld., leaf-opposed; fl. large, 1–1½ in. diam.; cal. cup-shaped, more or less 3-lobed, densely stellate-tomentose; pet. roundish densely tomentose on both sides; outer stam. barren, flattened; ripe carp. 1¼ in. long, shortly stalked, smooth.

Moist low country; rare. Matara; Mawarelle. Fl. Feb., August, Sept.; pinkish-red.

Also in East Bengal, Malay Peninsula, and Java.

The ripe fruit is said to be black, and to be eaten by the Sinhalese.

U. purpurea, Bl., a native of Java, with handsome purple-red fl., was long ago introduced to Ceylon, and is occasionally found in a half-wild state here.

3. **U. semecarpifolia,** *Hk. f. and Th. Fl. Ind.* 97 (1855).
Thw. Enum. 6. C. P. 244.
Fl. B. Ind. i. 49. Bedd. Ic. t. 82.

A woody climber, twigs with fulvous-stellate pubescence; l. large, 8–10 in., oval-oblong, obtuse, apiculate at apex, subcordate at base, coriaceous, glabrous above, sparsely stellate-hairy beneath; ped. 2–4-fld., bracts broad, truncate, fl. 1 in. diam.; cal. truncate, irregularly split; inner row of pet. smaller, imbricate, covering stam.; ripe carp. on stalks $\frac{1}{2}$–$\frac{3}{4}$ in. long, ovoid or subglobose, $\frac{3}{4}$–1 in. long, densely stellate-tomentose, receptacle large, globular.

Moist low country up to 3000 ft.; rare. Ratnapura; Deltota; Galagedara. Fl. May, September; pale buff colour.
Also at Malacca.

4. **U. macropoda,** *Hk. f. and. Th. Fl. Ind.* 101 (1855).
Thw. Enum. 6. C. P. 2544.
Fl. B. Ind. i. 50. Bedd. Ic. t. 79.

A large woody climber, shoots glabrous; l. 6–9 in., very shortly stalked, oblong-lanceolate, acuminate, glabrous on both sides, shining above; fl. solitary, large, 1$\frac{1}{2}$ in. diam.; ped. $\frac{3}{4}$–1 in., bud conical; cal. irregularly splitting into 2 or 3 segments, tuberculate; pet. ovate, acute, often united at base, leathery, densely stellate-tomentose, and slightly tuberculate outside; fr. with ped. and receptacle much enlarged and woody; ripe carp. 15–20, 2–3$\frac{1}{4}$ in., pendulous on stalks 6 or 7 in. long, oblong-linear, pointed, somewhat torulose, triangular on section, 6–12-seeded, brilliant scarlet.

Low country to about 2000 ft.; rather rare. Haragama; Allagalla; Kandy; Matale (Alexander). Fl. September; red.
Endemic.
The pendulous head of carpels is an extraordinary object, brilliant scarlet in colour; it is not figured in Beddome's plate.

5. **U. Narum,*** *Wall Cat. n.* 6473 (1828).
Hk. f. and Th. Fl. Ind. 102. Thw. Enum. 6. C. P. 1032.
Fl. B. Ind. i. 50. Wight, Ill. i. t. 6.

A woody climber, twigs glabrous; l. 4–6 in., oblong-acuminate, very shortly stalked, glabrous; fl. solitary, 1–1$\frac{1}{4}$ in. diam., buds globose, stellate-tomentose; sep. distinct or nearly so, rounded, apiculate; pet. usually connate at base, broadly ovate, acute, incurved, densely pubescent; ripe carp. very numerous, pendulous on slender stalks 1 in. long, oblong-ovoid 1–1$\frac{1}{2}$ in., smooth, bright scarlet-crimson.

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* *Narum-panel* is the name given for this in Rheede, *Hort. Mal.* ii. 11.

Low country, extending into lower montane zone; common. Haragama; Kandy; Hunasgiriya. Fl. April; yellowish-green.
Widely diffused in Southern India.

6. **U. zeylanica,** *L. Sp. Pl.* 536 (1753). **Palu-kan, Palanga,** S.
Herm. Mus. 8. Burm. Thes. 231. Fl. Zeyl. n. 224. Moon Cat. 43. Thw. Enum. 6. C. P. 1030.
Fl. B. Ind. i. 51. Bedd. Ic. t. 78.

A large woody climber, much branched, twigs densely pubescent; l. small, 2–4 in., very shortly stalked, oblong-lanceolate, acuminate, glabrous on both sides; fl. solitary, small, $\frac{3}{4}$–1 in. diam., buds globose; ped. $\frac{1}{2}$ in., pubescent; sep. distinct; pet. lanceolate, acute; ripe carp. small, $\frac{1}{2}$ in. long, very shortly stalked, ovoid or subglobose, torulose or transversely grooved, minutely and roughly pubescent or hoary.

Low country, especially in sandy ground near the coast; common. Colombo; Negombo; Puttalam; Mawerelle. Fl. most of the year; red.
Also in Malabar and Travancore.

2. CYATHOCALYX, *Champion.*

Trees; sep. combined into a cup-shaped calyx; pet. in 2 rows, both rows valvate, cupped at the base, inner row coherent at base and completely enclosing the essential organs; stam. truncate; carp. solitary, with several ovules, stigma capitate; fruit a large berry.—Sp. 3; all in *Fl. B. Ind.*

C. zeylanicus, *Champ. in Hk. f. and Th. Fl. Ind.* i. 127 (1855). **Kékala, Ipetta,** *S.*
Thw. Enum. 9. C. P. 1044.
Fl. B. Ind. i. 53. Bedd. Ic. t. 47.

A tall tree with a straight erect stem and slender horizontal or deflexed branches, bark smooth, young twigs pubescent soon becoming glabrous; l. large, 6–10 in., shortly stalked, oblong-lanceolate, acuminate, acute at base, glabrous on both sides, stiff, paler beneath; fl. large, solitary or 2 together; ped. $\frac{1}{2}$ in., terminal or extra-axillary, puberulous; cal. cup-shaped, truncate, with 3 minute distant teeth, finely pubescent; pet. 2–3 in. long, equal, narrowly oblong-ovate, tapering to obtuse apex, suddenly constricted into a cupped base, thick, very finely but densely pubescent within, the 3 inner completely coherent below the constriction and forming a concave cover over the stigma; stam. truncate; carp. solitary; ov. tapering, with several ovules in 2 rows, stigma large, lobulate,

capitate; fr. 2½–3 in. long, ovoid or subglobular, bluntly pointed, smooth, green, rather glaucous; seeds several, 1¼ in. long, ovoid, compressed, testa bony, pale brown, margined, transversely rugose on the sides.

Upper part of moist low country at an elevation of 1500–3000 ft.; common in forests. Kandy; Hantane; Deltota; Ambagamuwa; Galle; Ratnapura. Fl. May–July; pale apple-green, stigma dark red.

Also in Southern India.

The essential organs are completely enclosed by the connate cup-shaped bases of inner pet.

The tree grows very rapidly, and the enlarged scars of the leaves remain visible on trunks of large size, showing well their spiral arrangement. It often attains an immense height. Wood yellowish, soft, medullary rays distinct. The lacquered sticks used by Kandyan chiefs and others are usually made of this wood.

3. ARTABOTRYS, *Br.*

Woody climbers; fl. borne on flattened, hooked, woody branches or peduncles; pet. in 2 rows, nearly equal, with concave bases, inner row coherent at base and covering in the essential organs; carp. numerous, each with 2 ovules; ripe carp. fleshy, 2-seeded.—Sp. 15, 10 in *Fl. B. Ind.*

The younger branches climb by means of the hooked peduncles.

Petals equal; fruit smooth, shining . . 1. A. ODORATISSIMUS.
Inner row of pet. narrower, fruit hairy . . 2. A. ZEYLANICUS.

1. **A. odoratissimus,** *Br. in Bot. Reg. t.* 423 (1820) non Bl.
Una uncinata, Dun., Moon Cat. 43. Hk. f. and Th. Fl. Ind. 128. Thw. Enum. 9. C. P. 1042.
Fl. B. Ind. i. 54. Blume. Fl. Jav. Anon., t. 29 and 31 c. (*A. hamatus*).

A powerful, far-reaching, many-stemmed woody climber, the old stems of great thickness, covered with rather smooth grey bark, and furnished with thick woody pointed spreading spines about an inch long in pairs, young shoots slightly pubescent or glabrous; l. shortly stalked, 4–7 in., lanceolate, bluntly acuminate, tapering to base, thin, glabrous on both sides; fl. solitary or 2 together; ped. terminal or leaf-opposed, ¾ in. long, slender, springing from edge of dilated, flattened, strongly curved and hooked, rigid, pubescent ends of the branches; sep. small, ovate, acute, recurved; pet. equal, ¾ in. long, linear, acute, finely pubescent, contracted at base to form a concave cup more or less covering the stam. and carp., fr. of 3–8 carp., on a small woody recept., each 1½ in. long, oblong-ovoid or obovate bluntly pointed, tapering at the base,

smooth, fleshy, and juicy, yellow; seeds 2 in each carp., ¾ in. long, plano-convex, testa pale brown, smooth.

Dry low country, in forests, rather common, forming often dense masses of matted woody stems overhead. Dambulla; Sigiri; Atakalan Korale; Kolonna Korale. Moon's locality is Wellasse. Fl. July; pale green; fruit yellow.

Also in India, Java, and S. China.

I rather doubt this gigantic creeper of our dry forests being the cultivated species, *A. odoratissimus*, Br., which is described as an elegant shrub. It is not cultivated in Ceylon gardens, as is said to be the case in India.

2. **A. zeylanicus,** *Hk. f. and Th. Fl. Ind.* 128 (1855). **Petika-wel, Yakada-wel,** S.

Thw. Enum. 9. C. P. 1043.

Fl. B. Ind. i. 54. Bedd. Ic. t. 48.

A woody climber, stems much compressed, young shoots slightly pubescent; l. shortly stalked, 4–7 in., oval or lanceolate-oval, bluntly acuminate, slightly tapering at base, glabrous on both sides, shining above; fl. 3 or 4 together, arranged (as in the last) on hooked branchlets or peduncles, pedicels densely tomentose; sep. densely tomentose; pet. lanceolate-oblong tapering, densely pubescent-tomentose, the inner row narrower; fr. of 7–10 carp., ½–¾ in. long, sessile on a woody recept., broadly obovate-ovoid, shortly apiculate, slightly tapering at base, densely covered with hair which is easily removed, slightly fleshy; seeds ¾ in., oblong-ovoid, brown, rough.

Moist region in low country and extending into lower montane zone, in forests; rather common. Kottawa, S. Prov.; Ambagamuwa; Lunngala; Heneratgoda. There are specimens from Moon in Mus. Brit. (1819). Fl. December; pale green.

Also in Malabar, Travancore, and on the W. coast of India.

Very near *A. odoratissimus*, but smaller, with broader leaves, less tapering to the base, more hairy flowers, and more rounded carpels which are hairy.

The stems are much used for tying buildings, &c., and for foot-ropes when climbing trees.

Cananga odorata, Hk. f. and Th., though not native, is so commonly met with in an apparently wild state in the moist low country that it requires notice. It is a tall, quick-growing, straight tree with very large drooping strongly sweet-scented yellow flowers. It is a native of Burma, Java, and the Philippines. The scent known by the Malay name Ilang-ilang is said to be obtained from its flowers. The tree is often called 'Wana-sapu' or 'Rata-sapu' by the Singalese.

4. UNONA, *L.*

Small trees or shrubs; fl. solitary or 2; pet. in 2 series, valvate, nearly equal, flat; carp. numerous, ovules 2–8; ripe

carp. many, usually 2–3-seeded, and constricted between the seeds.—Sp. about 25; 18 in *Fl. B. Ind.*

Both our species belong to the section *Desmos.*

Carpels deeply constricted between the seeds . 1. U. ELEGANS.
Carpels slightly constricted between the seeds . 2. U. ZEYLANICA.

1. **U. elegans,** *Thw. Enum.* 398 (1864).
Thw. Enum. 398. C. P. 3824.
Fl. B. Ind. i. 58. Bedd. Ic. t. 50.

A small tree or shrub with many slender twigs; l. small, 3–5 in. long, narrowly lanceolate-oblong, acuminate, very acute at apex, tapering at base into a very short petiole, smooth on both sides, glaucous beneath; fl. solitary, on slender axillary or extra-axillary ped.; sep. $\frac{1}{4}$–$\frac{1}{3}$ in., ovate, acute, slightly pubescent; pet. $1\frac{1}{4}$–$1\frac{1}{2}$ in. when fully grown, oblong, bluntly acuminate, thick, glabrous or nearly so, inner row rather shorter; ripe carp. numerous, stalked, 1–3-seeded, constricted and jointed between seeds, rather rough, finely hairy.

Moist low country in forests below 1000 ft.; rare. Hiniduma and Pasdum Korale. Fl. September; pale green.
Endemic.

2. **U. zeylanica,** *Hk. f. and Th. Fl. Ind.* 132 (1855).
Thw. Enum. 9. C. P. 1037.
Fl. B. Ind. i. 58. Bedd. Ic. t. 74.

A small erect shrub, bark yellowish-grey, finely rugose; l. large, 7–9 in., shortly stalked, lanceolate-oblong, tapering to acute apex, acute at base, glabrous, very glaucous beneath, purplish or pink and flaccid when young; fl. solitary or two together, pendulous on slender glabrous ped., axillary, many from the old wood; sep. ovate, obtuse or subacute; pet. about 1 in., lanceolate-oblong, subacute, glabrous, the inner rather shorter; ripe carp. numerous, stalked, 1–3- usually 2-seeded, ovoid-oblong, pointed, slightly constricted between the seeds, glabrous, slightly rough, scarlet.

Upper part of moist low country; rather common. Hantane; Deltota; Peradeniya; Nilambe. Fl. April; pale greenish yellow, crimson at the base within. Fruit scarlet when ripe.
Endemic.

U. discolor, Vahl, a common Indian and Malayan species, is given for Ceylon in Hk. f. and Th. Fl. Ind. 133, but occurs here in gardens only, where it is grown for its sweet-scented flowers.

5. POLYALTHIA, *Bl.*

Trees or shrubs; fl. axillary or extra-axillary, often from the old wood; pet. biseriate, nearly equal, the inner often somewhat larger, flat or the inner concave; carp. numerous,

ovules 1–2; ripe carp. fleshy, 1- rarely 2-seeded.—Sp. about 30; 25 in *Fl. B. Ind.*

This genus is scarcely distinct from *Unona.* Our species were formerly referred to *Guatteria*, R. and P., but that genus as now understood is restricted to America.

Inner pet. flat; ovule solitary.
 Pet. narrow.
  Fls. in clusters . . . . 1. P. LONGIFOLIA.
  Fls. solitary . . . . 2. P. COFFEOIDES.
 Pet. ovate or oval.
  Fls. very large . . . . 3. P. ACUMINATA.
  Fls. small.
   Leaves acuminate . . . . . . 4. P. KORINTI.
   Leaves very obtuse . . . . . . 5. P. SUBEROSA.
Inner pet. concave; ovules two.
 Peduncles 1–1½ in. . . . . 6. P. MOONII.
 Peduncles under ½ in. . . . . 7. P. PERSICIFOLIA.

1. **P. longifolia,** *B. and Hk. f. in Thw. Enum.* 398 (1864). **Mara-illupai,** T.

Guatteria longifolia, Thw. Enum. 10. C. P. 1041.

Fl. B. Ind. i. 62. Bedd. Fl. Sylv. t. 38.

A large erect tree with slender branches, bark thick, rather smooth, young parts glabrous; l. long, 6–9 in., shortly stalked, oblong or ovate-oblong, very gradually tapering into long attenuate apex, acute or rounded at base, finely undulate, glabrous, thin, pellucid-dotted; fl. in axillary umbels or very short racemes mostly from the old wood, 3 to 10 or more together, pedicels 1 in. or more long, slender, pubescent, with a hairy bractlet half way up; sep. ovate-triangular, obtuse, tomentose; pet. ½ in. or more, lanceolate-linear, tapering, undulate, pubescent, the inner rather broader; carp. about 8, ovoid, 1 in. long, glabrous, on stalks ½ in. long.

Dry country in forests; common. Jaffna; Anuradhapura; Bintenne; Uma-oya. Also planted frequently. Fl. June, July; greenish-yellow; fruit purple.

Also in S. India (at Tanjore) and much cultivated as an avenue tree throughout the Peninsula.

Wood yellowish-white, rather soft, medullary rays conspicuous.

2. **P. coffeoides,** *Benth and Hk. f. in Thw. Enum.* 399 (1864). **Omara,** S. **Nedunarai,** T.

Guatteria coffæoides, Thw. in Hk. f. and Th. Fl. Ind. 141; Thw. Enum. 10. C. P. 2503.

Fl. B. Ind. i. 62. Bedd. Ic. t. 53 (not good).

A small tree with spreading branches, young twigs puberulous; l. shortly stalked, 5–9 in., lanceolate or oblong-lanceolate, bluntly acuminate, undulate, glabrous, shining above; fl. solitary, axillary on the old wood, ped. ½–1 in., puberulous; sep. short, distant, roundish-triangular; pet. ½–1 in., linear-oblong, subacute, glabrous, the inner rather

broader; carp. 7–12, 1 in. long, on stalks about ½ in., ovoid, bluntly pointed, fleshy, smooth and shining, dark inky-purple; seed grey, furrowed along one side.

Dry low country forests; common; extending up to 1500 ft. Near Kandy; Haragama: Anuradhapura. Fl. Jan.-March; apple-green.
Also in Wynaad, S. India.
The shining undulate leaves are very like those of coffee; they are not pellucid-dotted as stated in Fl. B. Ind.

3. **P. acuminata,** *Thw. Enum.* 399 (1864).
Thw. Enum. 399. C. P. 3653.
Fl. B. Ind. i. 63. Bedd. Ic. t. 57.

A tree, bark dark grey, twigs with yellowish tomentum; l. large, 7–10 in., broad- or obovate-oval, abruptly caudate-acuminate, narrowed at base, smooth above, hairy on veins beneath, petiole short, stout, densely pubescent; fl. large, 1–3 together on the old wood, ped. ½–1½ in. long, tomentose; sep. ovate, fulvous tomentose outside; pet. 1–1½ in. long, ovate, obtuse, thick, finely tomentose, the inner broader; carp. about 12, about 1 in., on stalks about the same length, ovoid, densely covered with yellowish tomentum.

Low moist country below 1000 ft.; rare. Pasdun Korale; near Ratnapura. Fl. Aug., Sept.; ochreous-yellow.
Endemic. A handsome plant.

4. **P. Korinti,*** *B. and Hk. f. in Thw. Enum.* 394 (1864). **Miwenna,** S. **Uluvintai,** T.
Guatteria Korinti, Dun., Moon Cat. 43; Thw. Enum. 10. C. P. 1034.
Fl. B. Ind. i. 64. Wight, Ic. t. 398.

A shrub with spreading branches, young shoots pubescent; l. 3–5 in., very shortly stalked, lanceolate or oval, acuminate or caudate, often slightly unequal at base, glabrous; fl. small, axillary, solitary or 2 together, ped. ½–1 in., pubescent, with 2 or 3 small, distant bractlets; pet. ¼–⅓ in., ovate, acute, thick and rigid, glabrous, the inner rather the larger; carp. numerous, shortly stalked, small, ⅓ in. or rather more, globular-ovoid, smooth, scarlet-crimson.

Low country up to 1500 ft.; very common. Fl. Sept.; bright green; fruit bright crimson.
Also in Southern India.

5. **P. suberosa,** *B. and Hk. f. in Thw. Enum.* 398 (1864). **Kalati,** S.
Guatteria suberosa, Dun., Moon Cat. 43; Thw. Enum. 10. C.P. 1053.
Fl. B. Ind. i. 65. Bedd. Ic. t. 56.

A small tree or a shrub, branches with thick ridges of cork, young shoots pubescent; l. small, 2½–4 in., shortly

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* Korinti is said to be a Hindu name for the plant by Rheede in *Hort. Malab.* v. t. 14.

stalked, oval-oblong, very obtuse, rounded and slightly unequal at base, glabrous above, slightly pubescent on veins beneath ; fl. small, solitary, ped. slender, extra-axillary, ½–1 in. long, slightly pubescent ; pet. ¼ in., oblong-oval, subacute, pubescent outside ; fr.-carp. numerous, size of a small pea, on very slender stalks rather longer than the carp., very slightly hairy.

Moist low country, below 1000 ft. ; rather rare. Kalutara ; Colombo ; Galle. Fl. July ; pale red ; fruit purplish.

Also in India, Burma, and probably Java.

6. **P. Moonii,** *Thw. Enum.* 9 (1858).
Thw. Enum. 9. C. P. 437.
Fl. B. Ind. i. 66. Bedd. Ic. t. 83.

A shrub 8–10 ft. high, with rigid branches, young shoots rough with fulvous hairs ; l. 4–6 in., lanceolate, acuminate, obliquely rounded at base, glabrous above, thinly pubescent beneath, petioles very short, thick ; fl. solitary, small, leaf-opposed, mostly on old wood ; ped. 1–1½ in. long, very slender, drooping, glabrous, bracts minute, basal ; sep. broadly oval, acute, pubescent ; outer pet. rotundate, acuminate, spreading ; inner larger, rounded, obtuse, cupped, fleshy ; ov. 2 ; fr.-carp. few, on stalks shorter than them, usually about the size of a pea and 1-seeded, rarely ovoid and 2-seeded.

Moist low country below 1000 ft. by the sides of streams ; rather common. Kalutara (Moon) ; Reigam Korale ; Mawerelle. Fl. Sept. ; crimson ; fruit reddish.

Endemic.

This is perhaps Moon's *Guatteria pumila*, Cat. 43

7. **P. persicifolia,** *Benth. and Hk. f. in Thw. Enum.* 399 (1864).
Guatteria persicifolia, Hk. and Th. Fl. Ind. 140. Thw. Enum. 10. C. P. 3917.
Fl. B. Ind. i. 66. Bedd. Ic. t. 55.

A shrub, young shoots hairy ; l. 2½–4½ in., on very short hairy petioles, lanceolate, acuminate, rounded and oblique at the base, glabrous above, very slightly hairy beneath ; fl. small, solitary or 2 together, extra-axillary, ped. under ½ in. long, slightly hairy ; sep. lanceolate, acute, slightly hairy ; outer pet. broad-ovate, acute, inner larger, suborbicular, thick, curved over the stam. and carp. ; fr.-carp. few, very shortly stalked, size and shape of a small pea, slightly hairy.

Moist low country ; Narawelle, near Galle (Champion) ; near Colombo (Ferguson) ; Marai-calai, near Ratnapura (Thwaites). Fl. Jan.–April ; pale red.

Endemic.

6. ANAXAGOREA, *St. Hil.*

A shrub; fl. axillary or extra-axillary or from old wood; sep. imbricate in bud; pet. biseriate, valvate, inner rather smaller; carp. 1–4, ovules about 3; ripe carp. 1–4, dry, woody, follicular, dehiscent, 1–2-seeded.—Sp. about 6; the following only in Fl. B. Ind.

A. luzonensis, *Gray, Bot. U.S. Expl. Exped.* 27 (1854).
A. zeylanica, Hk. and Th. Fl. Ind. 144; Thw. Enum. 10. C. P. 3883. Fl. B. Ind. i. 68. Bedd. Ic. t. 46 (bad).

A small erect shrub with smooth reddish-grey bark, young shoots glabrous; l. 4–8 in., oval, suddenly and bluntly caudate-acuminate, acute at base, glabrous and shining, paler with rather conspicuous venation beneath, petiole $\frac{1}{3}$–$\frac{1}{2}$ in.; fl. axillary or leaf-opposed, 3 or 4 together, or from knots on the old branches and trunk very much more numerous, ped. very short, stout, curved, bracts small, obtuse, sheathing; sep. suborbicular, imbricate in bud, very finely ciliate; pet. rather thick, concave, $\frac{3}{8}$ in., acute, outer row ovate, inner row smaller, spathulate-oblong, distant at base; stam. loosely arranged, anthers linear, connective scarcely prolonged; ov. 1–4, ovules about 3, styles subulate, curved; fruit-carp. 1–4, 1 in. long, elongate-pyriform, oblique, apiculate, glabrous, woody, dehiscent from above downwards; seeds 1 or 2, $\frac{1}{3}$ in. long, compressed-pyriform, black, shining.

Lower montane zone; rare. Yattiantota; Maskeliya; Kitulgala. Fl. March–July, December; pure white.

Also in Burma, the Andaman Islands, Malacca, and the Philippines, but not in Peninsular India.

The above description of the flower from living specimens differs a good deal from that in Fl. B. Ind.

7. XYLOPIA, *L.*

Trees; sep. more or less connate into a calyx; pet. biseriate, valvate, narrow, outer flat, somewhat hollowed at base, inner rather shorter, trigonous, connivent at concave bases; carp. 1–5, usually sunk in the hollowed torus, ovules 2–10; ripe carp. 1–5, ovoid, several-seeded.—Sp. 30–40; 14 in *Fl. B. Ind.*, but none occur in the Indian Peninsula.

Our species are all endemic.

Flower-buds, narrow, acute.
  Sep. connate half-way up . . . . . . 1. X. PARVIFOLIA.
  Sep. free almost to the base . . . . . 2. X. NIGRICANS.
Flower-buds broad-ovoid, blunt . . . . . 3. X. CHAMPIONII.

1. **X. parvifolia,** *Hk. f. and Th. Fl. Ind.* 125 (1855). **Netawu, Atukétiya,** *S.*

Unona tripetaloidea, Moon Cat. 43. *Patonia parvifolia*, Wight, Ill. i.* Thw. Enum. 9. C. P. 3335.

Fl. B. Ind. i. 84. Bedd. Ic. 43, and Fl. Sylv. t. 172.

A tall tree with a straight trunk, bark rather smooth, young shoots silky; l. 3–5 in., oval, acuminate, acute at base, glabrous, petiole ¼ in. finely pubescent; fl. axillary, 1 or 3 together, on very short ped., with several rounded imbricated bracts; sep. small, broad, united half-way up, acute, pubescent; pet. hairy, outer ½–⅔ in., linear-strap shaped, acute, hollowed at base, inner a little shorter, thick, trigonous, hollowed at base; stam. truncate; carp. 5, sunk in the receptacle, ovules 4–6 in 2 rows, styles elongated, fusiform; fr.-carp. 1–4, on very short thick stalks, broadly ovoid, 1–1½ in., glabrous or slightly hoary; seeds several, oblong, smooth, brown.

Moist low country; rather common. Near Colombo; Kalutara; Negombo. Fl. Sep.; ochre-yellow.

Endemic.

The bark, especially of the root, the flowers, and the fruit are all very sweet-scented and aromatic, and are chewed with betel. Wood yellowish-grey, soft.

2. **X. nigricans,** *Hk. f. and Th. Fl. Ind.* 125 (1855).

Thw. Enum. 9. C. P. 615.

Fl. B. Ind. i. 84. Bedd. Ic. t. 44.

A moderate-sized erect tree, bark smooth, grey, buds very finely silky; l. 3–4 in., oval, bluntly acuminate, acute at base, somewhat undulate, smooth and polished above, venation reticulate, not prominent; petiole ¼ in., slender, slightly pubescent; fl. axillary, 1–5 together, on short slender ped., bracts broadly ovate, pubescent, deciduous; sep. triangular-lanceolate, very slightly connate at base, slightly pubescent; outer pet. ¾–1 in., linear, concave at base, inner rather shorter, triquetrous; carp. 5, sunk in the torus, ovules about 10; fr.-carp. 2–5, narrowed at base, scarcely stalked, over 1 in. long, smooth; seeds 6–10, in 2 rows, ovoid, compressed, smooth, dark brown.

Low country; rare. Trincomalie; Between Kurunegala and Matale. Fl. Sept.; very sweet-scented, yellow.

Endemic.

3. **X. Championii,** *Hk. f. and Th. Fl. Ind.* 126 (1855). **Datkétiya,** *S.*

Thw. Enum. 9. C. P. 1038.

Fl. B. Ind. i. 84. Bedd. Ic. t. 45.

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* *Patonia* in compliment to Miss Paton (really Patton), better known to botanists as Mrs. (Colonel) Walker. Subsequently Wight dedicated another genus to this lady as *Pattonia* (Ic. t. 1750), which is now reduced to *Grammatophyllum*. (See also under *Diospyros Gardneri*.)

A tree, bark brown, buds very silky; l. 2½–4½ in., lanceolate or oval, slightly acuminate, subacute at base, glabrous above, slightly pubescent beneath, petioles ¼ in.; fl. solitary, axillary or supra-axillary, on very short curved hairy ped.; sep. combined to form a 3-lobed or 3-toothed cal., hairy; outer pet. ½–¾ in., very thick and fleshy, oblong, obtuse, downy; inner ⅓ in., shorter, linear-triquetrous above, concave and hollowed below; ov. solitary, with 4 ovules (Hooker); fr.-carp. 1¾ in., longitudinally 5-ribbed; seeds enveloped in pulp (Thwaites).

Moist low country to 2000 ft.; rather common. Ambagamuwa; Kurawita Korale; Ratnapura district; Morowak Korale. Fl. Dec.–March; pale yellow, the inner with a red-purple stain at base; sweet-scented.

Endemic.

I suspect that the flowers of this are often unisexual.

8. **GONIOTHALAMUS,** *Bl.*

Small trees or shrubs; sep. distinct; pet. biseriate, valvate, outer distinct, thick, flat, inner connate by their margins to form a cap or cone over the essential organs; carp. numerous, ovules 1 or 2, styles simple or 2-fid.; ripe carp. numerous, 1- (rarely 2-) seeded.—Sp. about 24; 17 in *Fl. B. Ind.*

Sepals persistent.
  Styles undivided.
    Outer pet. reaching 1½ in. . . . . . 1. G. THWAITESII.
    Outer pet. reaching 2 in.
      Leaves narrow lanceolate . . . . . 2. G. GARDNERI.
      Leaves oval . . . . 3. G. HOOKERI.
  Styles bilobed; outer pet. ⅔ in. . . . . . 4. G. WALKERI.
  Styles divided into 2 long branches . . . 5. G. THOMSONI.
Sepals not persistent.
  Leaves 5–10 in.; outer pet. ⅞ in. . . . 6. G. RETICULATUS.
  Leaves 4–5 in.; outer pet. ½–⅔ in. . . . 7. G. SALICINUS.

1. **G. Thwaitesii,** *Hk. f. and Th. Fl. Ind.* 106 (1855). **Kalukéra,** *S.*

Thw. Enum. 7. C. P. 1040.
Fl. B. Ind. i. 72. Bedd. Ic. t. 58.

A small or moderate tree, bark smooth, young shoots glabrous; l. 4–7 in., oval, bluntly acuminate, glabrous on both sides, margin slightly recurved, petiole ⅓–½ in.; fl. large, solitary or 2 together, axillary, ped. ¾–1¼ in., thickened upwards; sep. broadly ovate, acute, persistent, glabrous; outer pet. 1–1½ in., from ovate to narrowly ovate-oblong, tapering from broad base to subacute apex, glabrous, thick with an obvious midrib, somewhat reduplicate, inner pet. ⅓–¼ in., ovate-triangular, distinct at base, cone acute; styles simple,

tapering; fr.-carp. 10–20, shortly stalked, about ½ in., ovoid, with a blunt tip.

Lower montane zone, descending into the upper zone of moist low country; rather rare. Hunasgiria; Morowak Korale.

Fl. December, March, April; bright green.

Also in Travancore and in S. India.

2. **G. Gardneri,** *Hk. f. and Th. Fl. Ind.* 107 (1855).
Thw. Enum. 7. C. P. 1029.
Fl. B. Ind. i. 73. Bedd. Ic. t. 60.

An erect shrub, 8–10 ft.; l. 5–9 in., on short thickened petioles, narrowly lanceolate or lanceolate-oblong, tapering at both ends, bluntly acuminate, coriaceous, glabrous; fl. solitary, axillary, ped. ¼–½ in., thick, curved, bracts 2, basal, minute; sep. cordate-ovate, ½ in., subacute, persistent; outer pet. 2 in., oblong-lanceolate, not tapering, obtuse, flat, very thick, inner 1 in., narrowly ovate-triangular, cone acute, slightly pubescent within; fr.-carp. numerous, ¾–1 in., very shortly stalked, ovoid, apiculate, smooth, often 2-seeded.

Upper zone of low moist country; rare. Hantane; Kaduganawa.

Fl. November, December; pale green. Fruit orange-yellow.

Endemic.

Readily known from *G. Thwaitesii* by the different shape of the outer petals.

3. **G. Hookeri,** *Thw. Enum.* 6 (1858).
Thw. Enum. 6. C. P. 3399.
Fl. B. Ind. i. 73. Bedd. Ic. t. 66.

A tree, about 30 ft.; l. very large, 6–13 in., oval or oblong-oval, abruptly acuminate, tapering at base, glabrous, petiole ½–¾ in., very stout; fl. solitary, axillary or fasciculate on old branches, ped. ½ in., rather slender; sep. cordate-ovate, acute, slightly connate below, persistent; outer pet. 2 in., broad-lanceolate, subacute, cone of inner pet. acute; fruit-carp. numerous, very shortly stalked, ovoid; seeds brown, shining.

Forests in the moist low country below 1000 ft.; rather rare. Hiniduma and Reigam Korales; Hewesse; Singhe Rajah Forest. Fl. April; pale green.

Endemic.

4. **G. Walkeri,** *Hk. f. and Th. Fl. Ind.* 109 (1855). **Kapuru,** *S.*
Thw. Enum. 8, 398. C. P. 3825.
Fl. B. Ind. i. 74.

A small, slightly branched, erect tree, bark reddish-grey, twigs glabrous; l. 6–10 in., lanceolate, tapering, glabrous, rather thin, pale beneath, petiole ¼ in.; fl. axillary, ped. very short; sep. ovate, acute, ⅛ in., persistent; outer pet. ⅔ in., ovate-lanceolate, inner ⅓–½ in.; styles clavate with a bilobed stigma; fruit-carp. numerous, ½ in., oblong-ovoid, mucronate, glabrous, on very short stalks.

Moist low country; very rare. Only known from the Singhe Rajah Forest. Fl. Sept.; red.
Endemic.
The specimens in Herb. Perad. consist merely of leaves, but Thwaites has described the flowers, and Hooker (in his Fl. Ind.) the fruit.
The roots are fragrant when bruised and contain camphor, they are chewed by the Singhalese; the leaves are also aromatic.

5. **G. Thomsoni,** *Thw. Enum.* 7 (1858).
Thw. Enum. 7. C.P. 3398.
Fl. B. Ind. i. 74. Bedd. Ic. t. 59.

A small erect shrub, 1½–3 ft.; l. 5–7 or more in., obovate-oval or obovate-lanceolate, abruptly long-acuminate, narrowed at base, rather thin, glabrous, petiole ½ in., stout; fl. solitary or 2, from the old wood, ped. ¾ in., bent downwards at top; sep. lanceolate, acute, persistent; outer pet. 1½ in., much tapering to apex, rounded at base, cone of inner pet. ½ in., ovoid, acute; styles divided into 2 long filiform branches; fr.-carp. several, ⅓ in., ovoid, apiculate, shortly stalked.

Moist low country below 1000 ft.; very rare. Hiniduma Kande (Haycock Hill). Fl. May; yellow.
Endemic.

6. **G. reticulatus,** *Thw. Enum.* 7 (1858).
Thw. Enum. 7. C. P. 3397.
Fl. B. Ind. i. 75. Bedd. Ic. t. 64.

An erect shrub, 6–8 ft., young shoots blackish, strigose; l. 5–8 in., lanceolate-oblong, tapering to bluntly acuminate apex, subrotund at base, thin, very minutely and densely punctate, glabrous above, strongly reticulate and with small scattered black setæ beneath, petioles ¼ in., thickened, narrowly winged, tubercular and strigose; fl. solitary, from a little above the axils, ped. ¼ in., strigose; sep. ovate, acuminate, hairy, not persistent; outer pet. ¾ in., lanceolate, attenuate, hairy, cone ⅓ in., acute; styles clavate, stigma dilated bilobed, ov. densely strigose; fr.-carp. numerous, ⅔ in., shortly stalked, globose or ovoid, often 2-seeded.

Moist low country; very rare. Karanita Kande; Nillowe. Fl. September; 'red or yellow-brown;' fruit red.
Endemic.

7. **G. salicinus,** *Hk. f. and Th. Fl. Ind.* 106 (1855).
Thw. Enum. 7. C. P. 373.
Fl. B. Ind. i. 76. Bedd. Ic. t. 65.

A shrub, 10–12 ft., young shoots black-strigose; l. 4–5 in., lanceolate-oblong, tapering to acute apex, narrowed below, stiff, glabrous above, minutely gland-dotted, prominently veined beneath and set with scattered, short, stiff, black hairs; fl. axillary, solitary, ped. very short, curved; sep. ovate, ¼ in.,

acute, hairy, deciduous; outer pet. $\frac{1}{2}$–$\frac{2}{3}$ in., lanceolate, attenuate, acute, hairy; cone $\frac{1}{3}$ in., acute, hairy; ov. hairy; style thickened at top, bilobed; fr.-carp. $\frac{1}{2}$ in., very shortly stalked, ovoid, apiculate, finely hairy.

Moist low country extending up to 3000 ft.; rare, Adam's Peak; Ambagamuwa; Kukul Korale. Fl. Feb., March; reddish-yellow; fruit fulvous.

Endemic.

9. MITREPHORA, *Bl.*

Trees; sep. distinct; pet. biseriate, valvate, outer distinct, thin, flat, inner coherent, forming a vaulted cone over the essential organs; carp. numerous, ovules 3 or more; fruit-carp. several, 2–3-seeded.—Sp. about 10; 7 in *Fl. B. Ind.*

M. Heyneana, *Thw. Enum.* 8 (1858).

Orophea Heyneana, Hk. f. and Th. Fl. Ind. 110. Thw. Enum. 8. C. P. 1033.*

Fl. B. Ind. i. 77. Bedd. Ic. t. 77.

A medium-sized tree, with slender twigs, buds pubescent; l. $2\frac{1}{2}$–4 in., ovate-oval or ovate-lanceolate, somewhat attenuate, obtuse, rounded at base, sub-coriaceous, glabrous, finely and rather prominently reticulate-veined, petiole $\frac{1}{4}$ in.; fl. moderate-sized, solitary or 2–3 together, leaf-opposed or extra-axillary, ped. very short; sep. very small, obtuse, pubescent, outer pet. $\frac{2}{3}$ in., lanceolate or oval, acute, thin, spreading pubescent on both sides, cone of inner pet. acute; stam. very numerous, anther-cells distant; ov. hairy, ovules 3 or more; stigma large, globose; fr.-carp. several, nearly sessile, ovoid-oblong, $\frac{1}{2}$–$\frac{2}{3}$ in., hoary-pubescent, 2–3-seeded.

Dry country; rather rare. Haragama; Dambulla; Kalawewa; Horanpotana. Fl. Feb.-July. Very sweet-scented; dull yellow, the inner pet. spotted with red.

Also in Southern India.

Anona muricata, Dun. the Sour sop, and *A. reticulata*, L. the Bullock's heart, are common in native gardens. Both are tropical American, and were early introductions to the East, where no *Anona* is native. The *A. asiatica*, L. is indeed based on Hermann's Ceylon collections, but his drawing represents the Trop. American *A. squamosa*, L., the Custard-apple. Hermann seems to have also confused *Morinda citrifolia* with this. (See Journ. Linn. Soc. xxiv. 144.)

10. BOCAGEA, *St. Hil.*

Trees; l. coriaceous; sep. small, distinct or slightly coherent; pet. biseriate, nearly equal, 1 or both rows imbricate; stam. 6–20, connective produced, but not concealing anther-

* In a few collections some specimens of *Uvaria zeylanica* are mixed under this number.

cells; carp. 1–6, ovules 2–8; fr.-carp. 1–4, with 1 to several seeds.—Sp. about 12; 5 in *Fl. B. Ind.*

Stam. about 20	1. B. THWAITESII.
Stam. 6	2. B. OBLIQUA.
Stam. 9	3. B.(?) CORIACEA.

1. **B. Thwaitesii** *Hk. f. and Th. Fl. B. Ind.* i. 92 (1872).
Sagenea Thwaitesii, Hk. f. and Th. Fl. Ind. 93. Thw. Enum. 6. C.P. 2702.
Fl. B. Ind. i. 92. Bedd. Ic. t. 41.

A tree, bark blackish-brown; l. large, 8-13 in., lanceolate-oblong, obtuse or shortly obtusely acuminate, acute at base, glabrous, coriaceous, petiole $\frac{1}{2}$ in., stout; fl. in small clusters or solitary, axillary, mostly on the old wood, ped. $\frac{1}{2}$–$\frac{3}{4}$ in., bracts basal, glabrous, buds globular; sep. short, broad, very obtuse; pet. nearly equal, about $\frac{1}{2}$ in., orbicular, very obtuse, deeply concave, glabrous, outer rather larger, both rows strongly imbricate; stam. about 20; carp. 3–6, ovules about 8, in 2 rows, stigma bilobed; fr.-carp. 1–4, nearly sessile, $\frac{1}{2}$–$\frac{3}{4}$ in., subglobular, smooth; seeds several in each carp., oblong, somewhat compressed, transversely rugose, deeply channelled round margin.

Moist country from 1000 ft. to 4000 ft. in lower montane zone; rather common. Ratnapura; Maturata; Maskeliya; Ambagamuwa; Doluwa Kande.
Fl. Feb.–March; orange-yellow.
Endemic.

2. **B. obliqua,** *Hk. f. and Th. Fl. B. Ind.* i. 93 (1872).
Orophea (?) *obliqua*, Hk. f. and Th. Fl. Ind. 112. Thw. Enum. 8. C. P. 2703.
Fl. B. Ind. i. 93. Bedd. Ic. t. 72.

A moderate-sized tree, young twigs glabrous, angled; l. 4–6 in., oblong-oval or oblong-lanceolate, more or less tapering at each end, acuminate, obtuse or acute at apex, unequal at base, glabrous, very shortly stalked; fl. small, 2 or 3 together on very short slender pedicels at end of sub-terminal peduncles $\frac{1}{2}$–$\frac{3}{4}$ in.; sep. very small, triangular, coherent below; pet. nearly equal, $\frac{1}{8}$ in., oval, obtuse, fleshy, outer row spreading, inner imbricate; stam. 6, in 2 rows; carp. 3, with 2 ovules, stigma large, flattened; fr.-carp. 1–3, sessile, $\frac{1}{3}$–$\frac{1}{2}$ in., globose, glabrous, pinkish red, 1–2-seeded.

Moist low country; rare. Near Galle; near Ratnapura. Fl. March, April; deep rose-coloured.
Endemic.

3. **B. coriacea,** *Hk. f. and Th. Fl. B. Ind.* i. 93 (1872). **Keku,** *S.*
Orophea coriacea, Thw. Enum. 8. C. P. 2612.
Fl. B. Ind. i. 93. Bedd. Ic. 71.

A large tree, with blackish bark; l. 2½–4 in., subsessile or on very short swollen petioles, ovate, acute, rounded or subcordate at base, thick and coriaceous, glabrous, shining, midrib prominent beneath; fl. small, 1–4 together in pedunculate, axillary or subterminal clusters, pedicels slender, slightly pubescent, bracts small, strigose; sep. very small, ovate, acute, ciliate; pet. about equal, ⅙ in., outer row broadly ovate, acute, imbricate (?), inner row coherent to form a blunt cone; stam. 9, in three rows; carp. 1–2, ovules 2; fr.-carp. 1 or 2, ½ in., nearly sessile, subglobose, oblique, smooth, 1–2-seeded.

Lower montane region up to 5000 ft.; rather common. Raxawa; Dimbula; Maskeliya. Fl. April; purple, the outer pet. pale green within.

Endemic.

The very tough inner bark is used on estates for tying purposes.

This must be regarded as a doubtful member of the genus. I have not seen fresh flowers, but neither row of petals appears to be imbricate in dried ones. It ought perhaps to form a separate genus from both *Orophea* and *Bocagea*, but seems nearer the former, where Thwaites puts it.

11. MILIUSA, *Leschen.*

Shrubs; sep. very small, distinct; pet. biseriate, valvate; outer pet. very small, sepaloid, inner much larger, somewhat cupped at base, coherent when young by margins; stam. 20–30, anther-cells not concealed; carp. numerous, 1–2-ovuled; fruit-carp. numerous, 1–2-seeded. Sp. 7; all in *Fl. B. Ind.*

Leaves 1–3 in.	Inner pet. ovate-oblong . . .	1. M. INDICA.
Leaves 3–6 in.	Inner pet. linear-oblong . . .	2. M. ZEYLANICA.

1. **M. indica,** *Lesch. in A. DC. Mem. Soc. Genev.* V. 213 (1832).
Guatteria montana, Moon Cat. 43. *Miliusa montana*, Gardn. in Hk. f. and Th. Fl. Ind. 148. Thw. Enum. 10. C. P. 194.
Fl. B. Ind. i. 86.

A much-branched, twiggy shrub, bark rather rough, lenticillate, young shoots more or less pubescent; l. small, numerous, 1–3 in., usually oval-oblong, obtuse, rounded or subcordate at base, sometimes lanceolate and acute, rarely subrotund, glabrous or more or less pubescent or strigose; fl. solitary, axillary, drooping on short curved ped.; sep. very small, ovate, acute, ciliate; outer pet. very small, sepaloid, imbricate, oblong, about twice as long as sep., ciliate, spreading, subpersistent, inner much longer, ½–1 in., oblong or ovate-

oblong, obtuse, somewhat cupped at base, at first coherent by their margins, afterwards free but connivent; anth.-connective not prolonged, cells contiguous; carp. smooth, 1 or 2 ovules; fruit-carp. numerous, sessile or very shortly stalked, globular, ½ in. or more, smooth, purple or pink; seeds smooth, yellow.

Var. β. **tomentosa,** *Thw. Enum.* 10. C. P. 1036.

Leaves beneath and young shoots more or less densely tomentose.

Upper zone of moist low country; rather common. Hantane; Balangoda; Badulla; Raxawa; Kolonna Korale; Uva (Moon). Var. β. extending into the dry districts also, as at Polonarua, and in Eastern Province, where Mr. Nevill tells me it is called 'Kekili-mæssa.' Fl. Feb., March; yellowish-green, the lower part reddish-purple.

Also in Southern India.

I do not find the fruit of var. β. pubescent, as stated in Fl. B. Ind.

2. **M. zeylanica,** *Gardn. in Hk. f. and Th. Fl. Ind.* 149 (1855).
Thw. Enum. p. 11. C. P. 2678.
Fl. B. Ind. i. 87. Bedd. Ic. t. 89.

A large shrub, bark wrinkled, young shoots pilose; l. 3–6 in., lanceolate or oval, attenuate, acute, subacute at base, glabrous, except the midrib beneath, which is often strigose, petiole very short, strigose; fl. solitary, axillary, drooping, ped. slender, ¼–½ in. long; sep. and outer pet. very small, equal or nearly so, oblong, acute, ciliate, inner pet. ¾ in. or more, oblong-linear, obtuse or subacute, somewhat cupped at base; fr.-carp. numerous, nearly sessile, crowded, nearly globose, about size of a pea, glabrous, minutely granular, often 2-seeded.

Shady places in moist low country, especially near the shore. Weligama; Bentota, common under the cocoanut palms; Reigam Korale.

Fl. Nov.; yellowish-green suffused with reddish purple at base.

Endemic.

12. OROPHEA, *Bl.*

Small trees or shrubs; sep. distinct; pet. biseriate, valvate, inner much larger, clawed, coherent by the margins to form a pointed cone over the essential organs; stam. 6, anther-cells not covered; carp. about 15, ovules 4; fruit-carp. few, 1–2-seeded.—Sp. about 16; 8 in *Fl. B. Ind.*

O. zeylanica, *Hk. f. and Th. Fl. Ind.* 111 (1855).
Thw. Enum. 8. C. P. 2406.
Fl. B. Ind. i. 90. Bedd. Ic. t. 70.

A shrub or small tree, young shoots pubescent; l. 2–3½ in., oval, obtusely acuminate, acute at base, glabrous, very shortly

stalked; fl. rather small, on slender pilose ped., solitary or in axillary, few-fld., stalked clusters, bracts small, very hairy; sep. ovate, acute, hairy; outer pet. $\frac{1}{4}$ in., very broadly ovate, acute, spreading, pubescent, inner considerably larger, trapezoid, glabrous, cohering by their margins to form a long-pointed cone; stam. 6; carp. about 15; fruit-carp. few, shortly stalked, nearly globose, $\frac{1}{3}$–$\frac{1}{2}$ in., glabrous, 1–2-seeded.

Upper zone of moist low country and lower montane zone; rare (?) Hantane; Dolosbagie. Fl. Sept.; brownish-green.

Also in Western India.

Leaves often deeply tinged with brownish-purple.

13. **ALPHONSEA,** *Hk. f. & Th.*

Trees; sep. very small, distinct; pet. biseriate, equal, valvate; stam. 15–30, anther-cells not concealed; carp. 1–5, ovules 4–10, in 2 rows; fruit-carp. 1–5, with 4–10 seeds. —Sp. 7; all in *Fl. B. Ind.*

Pet. $\frac{1}{2}$ in. long.
  Pet. obtuse . . . . 1. A. LUTEA.
  Pet. acute . . . . 2. A. ZEYLANICA.
Pet. $\frac{1}{4}$ in. long. . . . . 3. A. SCLEROCARPA.

1. **A. lutea,** *Hk. f. and Th. Fl. Ind.* 153 (1855).
Thw. Enum. 399. C. P. 3826.
Fl. B. Ind. i. 89. Bedd. Ic. t. 91 (from Ceylon specimens).

A tree, young shoots pubescent; l. $2\frac{1}{2}$–5 in., oval or ovate-oval, attenuate, obtuse, shortly tapering to base, glabrous except midrib pubescent beneath; fl. in small leaf-opposed fascicles, ped. short, densely pubescent, buds subglobular; sep. very small, rounded, densely pubescent; outer and inner pet. equal, $\frac{1}{2}$ in., ovate, obtuse, densely pilose outside, more or less glabrous within; carp. 4–10, style oblong, densely hairy; fruit-carp. 1–5, shortly stalked, broadly ovoid, obtuse, 1–$1\frac{1}{2}$ in., fleshy, yellow, with a very fine brownish tomentum, juicy within when ripe; seeds 8–10 in 2 rows, compressed, covered with adherent yellow pulp, testa thin brown.

Low country in both moist and dry regions; very rare. Panadura; plentifully in the Sillankandal Forest; Puttalam (Col. Clarke). A drawing of a fruit brought from Dambulla also probably belongs to this species.

Fl. Sept.; ochreous-yellow.

Also in India and Ava.

2. **A. zeylanica,** *Hk. f. and Th. Fl. Ind.* 153 (1855).
Thw Enum. 11. C. P. 1039.
Fl B. Ind. i. 89. Bedd. Ic. t. 90 (from Ceylon specimens).

A tree, buds pubescent; l. 2–3 in., narrowly lanceolate, caudate-acuminate, obtuse, attenuate at base, glabrous, shortly stalked; fl. solitary or 2 together, extra-axillary, ped. $\frac{1}{3}$ in., curved, hairy; sep. minute, reflexed; outer and inner pet. equal, $\frac{1}{2}$ in., ovate, acute, outer spreading; stam. about 30; carp. 1–5, pilose; style very short, thick; fruit-carp. 1–4, on stalks $\frac{1}{2}$ in., globose or nearly so, 1 in., hard and woody, somewhat wrinkled, covered with fine close fulvous tomentum.

Upper zone of the moist low country, ascending into lower zone of the montane region; common. Hantane; Matale; Hunasgiria; Lagalla; Ramboda; Galagama. Fl. Sept., March; pale yellow.
Also in Travancore.

3. **A. sclerocarpa,** *Thw. Enum.* 11 (1858).
Thw. Enum. 11. C.P. 2727.
Fl. Brit. Ind. i. 89.

A tree, bark rough, grey, buds fulvous-pilose; l. 2–3$\frac{1}{2}$ in., lanceolate, obtuse, tapering to base, often somewhat falcate, glabrous, shortly petioled; fl. small, in leaf-opposed fascicles or on the old wood, ped. very short, hairy; sep. very small, rounded, pilose; outer and inner pet. about equal, $\frac{1}{4}$ in., lanceolate, obtuse, the inner rather narrower, pilose externally; stam. about 15; carp. 3–5, ovules about 8 in 2 rows, style short, glabrous; frt.-carp. 3–5, on stout stalks $\frac{1}{4}$ in. long, subglobose or ovoid, 1–2 in., very hard and bony, coarsely warted, covered with short yellowish tomentum.

Low country; very rare. Only known from or near Haragama on the old road from Kandy to Badulla. Fl. March; very pale greenish-yellow.
Endemic.

V.—MENISPERMACEÆ.

TWINING shrubs or rarely herbs; l. alternate, simple, entire, without stip.; fl. very small, unisexual, diœcious; sep. 6, in 2 rows (rarely 5 or 4 or 1), imbricate, distinct, rarely connate; pet. 6 (rarely 4 or 3 or 1 or 0), distinct (rarely connate); stam. 6, in 2 rows (rarely numerous), opp. pet., distinct or monadelphous, usually represented by staminodes in fem. fl.; carp. 3–6 (rarely 12 or 1), ovule solitary; ripe carp. indehiscent (drupes), with style-scar lateral or sub-basal or sub-terminal, endocarp thin, hard, often deeply excavated on ventral surface and projected inward; seed usually more or less

reniform or hooked, curved round the projection of endocarp, embryo with flat or narrow cotyledons, curved in axis of even or ruminate endosperm (rarely without endosperm).

Carp. 3 or more.
  Seed ovoid or reniform.
    Style-scar on ripe carp. sub-terminal . . . 1. TINOSPORA.
    Style-scar lateral or sub-basal.
      Stam. monadelphous. Pet. 0 . . . 2. ANAMIRTA.
      Stam. in 2 rows, outer free. Pet. 3 . . . 3. COSCINIUM.
  Seed horseshoe-shaped or hooked.
    Endosperm ruminate on ventral side . . . 4. TILIACORA.
    Endosperm not ruminate.
      Anth. bursting vertically . . . . . 5. LIMACIA.
      Anth. bursting transversely . . . . . 6. COCCULUS.
    Endosperm none . . . . 7. PACHYGONE.
Carp. solitary. Stam. monadelphous.
  Sep. of male fl. 6 distinct; pet. distinct . . . 8. STEPHANIA.
  Sep. of male fl. 4 distinct; pet. connate . . . 9. CISSAMPELOS.
  Sep. of male fl. 4, connate; pet. connate . . . 10. CYCLEA.

Almost entirely a tropical family. Of our 13 species 4 are confined to the dry region and 7 to the moist region, of which 2 ascend into the lower montane zone, whilst 2 occur in both regions. No species is endemic here.

The very small size of the flowers renders them difficult to examine.

1. TINOSPORA, *Miers.*

Extensive climbers; fl. in axillary racemes or panicles; sep. 6, in 2 rows, inner much longer; pet. 6, shorter than inner sep.; male fl.:—stam. 6, distinct, fil. thickened upwards; fem. fl.:—carp. 3, styles short, stigmas broad, staminodes 6, very small; ripe carp. 1–3, style-scar subterminal, endocarp thin, with a deep depression on the ventral surface; seed ovoid, deeply hollowed on the ventral side, endosperm ruminate on ventral side only, cotyledons flat, foliaceous, divaricate.—Sp. about 8; 5 in *Fl. B. Ind.*

Leaves larger, 4–5 in. long.
  Leaves tomentose beneath . . . . . . 1. T. MALABARICA.
  Leaves quite glabrous . . . . 2. T. CRISPA.
Leaves smaller, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long . . . . . 3. T. CORDIFOLIA.

1. **T. malabarica,** *Miers, Ann. Mag. Nat. Hist., ser.* 2, vii. 38 (1851). **Bu-kinda, Walkinda,** *S.*

Hk. f. and Th. Fl. Indica, 183. Trim. in Journ. Bot. 1885, 141. C. P. 2804 (in part).

Fl. B. Ind. i. 96 (not given for Ceylon). Rheede, Hort. Mal. vii. t. 19.

Stems wide-climbing, $\frac{1}{2}$ in. diam., smooth and shining, with white or reddish papery bark, more or less worted, internodes

long, young shoots pubescent or subtomentose ; l. 4–5 in. broadly cordate-ovate, acute, pubescent above, finely tomentose and whitish beneath, petioles very long, pubescent, twisted at base, leaving a prominent scar after falling ; fl. on slender pedicels, in small clusters, arranged in slender drooping spicate panicles 4–5 in. long, and solitary from the axils of fallen leaves ; male fl.:—stam. adnate to base of pet. ; fem. fl.:—stigmas capitate ; ripe carp. 1–3, usually 2, on very short thick stalks, ovoid, smooth, ½ in., endocarp tubercled.

Var. β. **tomentosa,** *Miers, l. c.* 39 (sp.). Thw. Enum. 12. C. P. 2804 (part).

L. larger, 5–7 in., with 3–5 acute palmate lobes.

Low country ; rather common. Heneratgoda, abundant. Var. β. Kurunegala ; Gonagama. Fl. July ; pale green-yellow ; fr. crimson-red.

Also in India and Burma.

T. tomentosa is kept up a species in Fl. B. Ind. (not given for Ceylon), but I fail to find good characters to distinguish it.

*2. **T. crispa,** *Miers, l. c.* 40 (1851). **Titta-kinda,** *S.*
Trim. in Journ. Bot. 1885, 141.
Fl. Brit. Ind. i. 96. Rumph. Herb. Amb. v. t. 44, fig. 1 (good).

Stems widely climbing and twining, similar to the last, but much more strongly worted ; l. 4–5 in., broadly orbicular-cordate, suddenly acuminate, 7-veined, glabrous on both sides, thin, petioles 3–4 in., thickened and twisted at base, smooth ; fl. 1–3 together, on very slender pedicels, in the axils of small, persistent bracts, rather distantly arranged in slender pendent spicate racemes or panicles 4–6 in. long from axils of old leaves ; male fl. as in the last ; female fl. and ripe carp. not seen.

Moist low country ; doubtfully native. Kaduwella, 10 miles from Colombo, abundant ; Asgiriya Temple near Heneratgoda. Fl. May ; greenish-white.

Not found in Peninsular India, but extends from East Bengal to Malacca, and is common in the Malay Archipelago.

All the plants I have seen are male. The fruit is said to be larger than in *T. malabarica*, and pale yellow.

Considered to be a valuable tonic medicine and bitter febrifuge, and not improbably an introduction to Ceylon by the Malays. Moon includes it in his list of Sinhalese names (Cat. pt. 2, p. 8), and it is cultivated in native gardens. The stems drop down very long slender aërial roots from great heights (as in *T. cordifolia*).

3. **T. cordifolia,** *Miers, l. c.* 37 (1851). **Rasa-kinda,** *S.* **Chintil,** *T.*

Herm. Mus. 27. Fl. Zeyl. n. 358 (referred by Linn. Sp. Pl. 1033, to *Dioscorea alata*). Thw. Enum. 12. C. P. 1053.

Fl. Brit. Ind. i. 97. Miers Contrib. Bot. t. 91. Bentl. and Trim. Med. Pl. t. 12.

Stems climbing to a great height, and sending down very long thread-like aërial roots, closely worted, shoots glabrous; l. small, $1\frac{1}{2}$–$2\frac{1}{2}$ in., broadly cordate, acute or acuminate, glabrous, thin, 5–7-nerved, petioles 1–2 in., slender, thickened and curved at base; fl. large for the order, $\frac{3}{4}$ in. diam., male in clusters of 1–6 on the slender branches of a drooping panicle exceeding the leaves, female in shorter racemes, solitary; male fl.:—stam. free, but wrapped in the pet.; female fl.:—stigma dilated, laciniate; ripe carp. 1–3, size of a pea, somewhat ovoid, apiculate, smooth, red.

Low country; common in the dry districts. Batticaloa; Kalpitiya; Hewahetta; Jaffna; Mannar. Fl. Feb.; greenish-yellow. Fruit red.

Also in Southern India.

2. ANAMIRTA, *Colebr.*

Woody climbers; fl. in panicles from old wood; sep. 6, equal, imbricate; pet. 0; male fl.:—stam. numerous, filaments combined into a central column; fem. fl.:—carp. 3–5, on a stout globular gynophore, staminodes 10, in a ring; ripe carp. 1–3, globose, style-scar lateral, endocarp brittle, deeply projected inwards on ventral side and reflexed in the cavity thus formed making it 2-celled; seed reniform, embryo with narrow cotyledons in axis of abundant, not ruminated, endosperm.—Sp. 7 (Miers), only the following one in *Fl. B. Ind.*

A. paniculata, *Colebr. in Trans. Linn. Soc.* xiii. 66 (1821). **Titta-wel,** *S.*

A. toxifera, Miers, Contrib. iii. 51. Thw. Enum. 12. C.P. 2722.

Fl. B. Ind. i. 98 (*A. Cocculus*, W. and A.) Miers l. c. t. 97 Bentl. and Trim. Med. Pl. t. 14 (drawn from a Ceylon specimen).

A large woody twiner, bark thick, vertically furrowed or corrugated, young shoots glabrous; l. 3–6 in., broadly ovate, acute or obtuse, rounded or subcordate at base, sub-coriaceous, glabrous above, paler and with very small tufts of hair in the axils of the veins beneath, petioles 2–4 in., thickened and prehensile at lower ends; fl. $\frac{1}{4}$ in. diam., with 2 or 3 small bracts at base, on short, thick divaricate pedicels, arranged on the horizontal branches of large glabrous panicles 8–12 in. long springing from the old leaves, buds globular; sep. equal, ultimately reflexed; pet. 0; male fl.:—anth. forming a globose

head on the short, stout column of coherent filaments, anth. square; fem. fl.:—carp. usually 5, on a short globose gynophore, surrounded at base by a ring of 10 very small bifid fleshy staminodes, smooth, stigmas reflexed; ripe carp. 1–3 (usually 2), on thickened branches of enlarged gynophore, nearly globose, ½ in., smooth, black.

Moist low country, up to 2000 ft.; rather common. Fl. May, June; pale greenish-yellow, sweet-scented.

Also in Eastern Bengal, S. India, and the Malay Archipelago.

The seeds are very bitter and poisonous, and are known as 'Cocculus indicus' in pharmacy and in trade; they do not appear to be used in Ceylon.

3. **COSCINIUM,** *Colebr.*

Woody climbers; fl. in globose heads; sep. 6; pet. 3; male fl.:—stam. 6, in 2 rows, outer distinct, inner coherent half-way up; fem. fl.:—carp. 6, styles deflexed, staminodes 6; ripe carp. 1–3, globose, endocarp bony, very hard, deeply projected inwards on ventral face; seed with endosperm ruminate on ventral side, cotyledons laciniate.—Sp. 3 or 4; 2 in *Fl. B. Ind.*

C. fenestratum, *Colebr. in Trans. Linn. Soc.* xiii. 65 (1821). **Weni-wel,** *S.*

Herm. Mus. 27. Fl. Zeyl. n. 436 (*Hibiscoides*). *Menispermum fenestratum*, Gaertn. Fruct. i. 219. *Cissampelos convolvulacea*, var. *β.*, Moon Cat. 70. Thw. Enum. 12. C. P. 1055.

Fl. B. Ind. i. 99. Miers, Contrib. iii. t. 88.

A woody climber, bark smooth, young shoots densely but finely yellow-tomentose; l. large, 4–8 in., broadly ovate or roundish, suddenly acute, truncate, rounded subcordate or slightly peltate at base, entire, glabrous above, densely felted with fine yellow tomentum beneath, strongly 5–7-nerved, nerves and reticulated veinlets very prominent beneath, petioles 3–4 in.; fl. sessile in small dense rounded heads, which are long-stalked and umbellately or racemosely arranged in the axils of the leaves, ped. yellow-tomentose, bracts beneath the fl. numerous, small, imbricated; sep. rounded; pet. ovate, spreading; fem. fl.:—carp. hairy, styles filiform, reflexed; ripe carp. 1–3, globose, ¾ in., densely finely tomentose, brown.

Moist low country; common. Fl. Jan.–March; yellow.

Also at Malacca and Singapore, and doubtfully in S. India.

Konig's specimens are labelled 'Cissampelos aurea' by him.

The wood is of a bright yellow colour, and is valued as a bitter tonic by the Sinhalese. It has been exported to England as a substitute for

Calumba root, and called 'false calumba' (see W. J. Hooker in Pharm. Journ. Oct. 1852). A yellow dye is also obtained from it.

The leaves of the young shoots are often deltoid-oblong, truncate and peltate at the base. The yellow tomentum becomes dull white when dry in the herbarium.

4. **TILIACORA,** *Colebr.*

Woody climber; fl. in panicles; sep. 6, biseriate, inner larger; pet. 6, minute; male fl.:—stam. 6, anth. adnate; fem. fl.:—carp. 3–12; seed strongly hooked, endosperm ruminate, cotyledons linear.—A single species.

T. racemosa, *Colebr. in Trans. Linn. Soc.* xiii. 67 (1821).

T. cuspidiformis, Miers, l. c. 78. *T. acuminata*, Thw. Enum. 12. C. P. 1056.

Fl. B. Ind. i. 99. Miers, Contrib. iii. t. 104.

A woody climber, young shoots glabrous; l. 4–5 in., ovate, somewhat attenuate, acute, rounded at base, undulate, glabrous, somewhat 3-veined, petiole $\frac{3}{4}$–1 in., slender; fl. $\frac{1}{4}$ in., stalked, rather laxly arranged in elongated axillary panicles shorter or longer than leaves, ped. with 2 small bractlets at base; sep. erect, inner row much the longer, lanceolate, acute; pet. spathulate, obtuse; fem. fl.:—style short, subulate; ripe carp. 1–10, ovoid, $\frac{1}{2}$ in., on short stalks, smooth, endocarp wrinkled, seed bent double.

Dry country; rather common. Dambulla; Kantalai; Batticaloa. Fl. Jan., Feb.; yellow. Fruit red or yellow.

Throughout the Indian and Malay Peninsulas, Java.

Miers gives another species for Ceylon, *T. fraternaria*, distinguished by its hermaphrodite flowers. It is based on specimens in the British Museum collected in 1785 by the Danish missionaries, and labelled 'Kaddukoddi Smilax zeylanica, Pseudochina.'

5. **LIMACIA,** *Lour.*

Slender woody climbers; fl. in small panicles; sep. 6, in 2 rows, inner much larger; pet. 6, short; male fl.:—stam. 6, anth. adnate; fem. fl.:—carp. 3; ripe carp. 1–3; seed curved into a circle, endosperm not ruminate, cotyledons elongate, linear.—Sp. 4; all in *Fl. B. Ind.*

L. cuspidata, *Hk. f. and Th. Fl. Ind.* 189 (1855). **Niri-wel,** *S.* [PLATE IV.]

Hypserpa cuspidata, Miers, l. c. 102. Thw. Enum. 12. C. P. 1051.

Fl. B. Ind. i. 100. Miers, Contrib. iii. t. 108 (*Hypserpa*).

A small twining shrub, branches slender, striate, pubescent; l. small, $1\frac{1}{2}$–3 in., ovate-lanceolate, acute, cuspidate, often

twisted at apex, rounded or tapering at base, glabrous, thick, somewhat 3-nerved at base, finely reticulate, petiole ½ in., slender; fl. few, in small, axillary, racemose clusters much shorter than the leaves, bracts small, subulate; sep. surrounded at base by several small rounded bracts, inner row much larger, rotund, concave; pet. ½ length of inner sep., truncate; male fl.:—stam. as long as pet.; ripe carp. 1–3, usually 2, ⅝ in., ovoid-pyriform, sessile, smooth, endocarp hard, with a large round intrusion, wrinkled; seed curved into a circle round the central cavity.

Low country and lower zone of hill country to 4000 ft.; rather common. Deltota; Pussellawa; Dimbula; Passara; Bintenne. Fl. July–Sept.; yellow. Fruit dull reddish-purple.

From East Bengal through the Malay Peninsula and Islands.

This is considered a separate genus, *Hypserpa*, by Miers, who gives 2 other species for Ceylon, *H. pauciflora* and *H. uniflora*, but they cannot be distinguished even as varieties. The number of sep., pet., and stam. seems to vary. I do not find the structure of the fruit to be as described in Fl. B. Ind.

A plant from Lunugala, Uva (with male fl.), may be distinct; the leaves are lanceolate-oblong, smaller, and show no tendency to be tripli-nerved at the base.

6. COCCULUS, *DC.*

Woody climbers; fl. in panicles; sep. 6, biseriate, inner larger; pet. 6; male fl.:—stam. 6, anth.-cells bursting transversely; fem. fl.:—carp. 3, staminodes 6; fruit-carp. compressed, endocarp hard, keeled on back, transversely ridged, hollowed at sides or perforated; seed doubled into a hook, endosperm scanty, not ruminate, cotyledons linear, flat.—Sp. about 10; 5 in *Fl. B. Ind.*

Leaves 2–3½ in. long, panicle 1½–2 ft., carp. ⅞ in. . . 1. C. MACROCARPUS.
Leaves 1½–1 in., panicle 1 in., carp. ⅙ in., endocarp perforated . . . . 2. C. VILLOSUS.

1. **C. macrocarpus,** W. and A. Prod. 13 (1834).
Diploclisia inclyta, Miers, l. c. 282. Thw. Enum. 13. C. P. 1052.
Fl. B. Ind. 101. Wight, Ill. i. t. 7. Miers, Contrib. iii. t. 127.

A large woody climber, bark smooth, young shoots striate, glabrous; l. 2–3½ in., rotundate, rather broader than long, obtuse, apiculate, undulate, glabrous, 5-nerved, glaucous beneath, petioles 1–2 in., slender, flexuose, divaricate; fl. very numerous, in very large, much-branched, glabrous, pendulous panicles 1½–2 ft. long from the old wood; inner sep. oval, rather larger than outer ones; pet. smaller, with lateral lobes; male fl.:—anth. subglobose; fem. fl.:—carp. smooth, style

horizontal; ripe carp. 1–2, nearly sessile, $\frac{7}{8}$ in., obliquely ovoid, compressed, tapering to short neck, glabrous, glaucous, style-scar conspicuous, basal, endocarp strongly transversely ridged, seed doubled into a hook.

Moist low country to 2000 ft.; rather common. Allagalla; Peradeniya; Uva. Fl. June; pale yellow. Fruit pale glaucous orange. Also in Southern India and South China.

2. **C. villosus,** *DC. Syst. Veg.* i. 525 (1818).
Fl. B. Ind. i. 101 (not given for Ceylon). Miers, l. c. t. 126 (*Holopeira*).

A small, much-branched, straggling climber, branches long, slender, twining, striate, hairy-pubescent; l. 1–1$\frac{1}{2}$ in., deltoid-ovate, very obtuse, apiculate or mucronate, tapering or truncate at base, almost entirely glabrous above (save when young), slightly hairy on veins beneath, ciliate at margin, 3–5-veined at base, petiole $\frac{1}{4}$ in., hairy; male fl. in small cymose panicles, on very slender axillary peduncles shorter than the leaves, bracts subulate, hairy; fem. fl. 2 or 3 together in axillary clusters; sep. villous outside; pet. bifid, lobed at sides; male fl.:—stam. with filaments hairy at base; fem. fl.:—carp. smooth; ripe carp. small, $\frac{1}{8}$ in., endocarp bony, horse-shoe-shaped or rather annular, with the centre perforated, sharply keeled along the back, the sides with strong transverse ridges.

Dry country; rare. Trincomalie (Glenie); between Jaffna and Kankesanturai. Fl. Feb.–March.

Peninsular India, Burma, Trop. Africa.

The specimens collected at Jaffna were in very young bud and would have been scarcely determinable but that they clearly corresponded with better ones in fruit collected at Trincomalie many years ago by Mr. Glenie (and labelled '*Pachygone ovata*' by Thwaites). Our form is very much less hairy than those from India.

The perforated annular endocarp is remarkable, and the basis of Miers' genus *Holopeira*.

7. PACHYGONE, *Miers.*

Climbers; fl. racemed; sep. 6, in 2 rows, inner much longer; pet. 6; male fl.:—stam. 6, free, anth. bursting horizontally, rudimentary carp. 3; fem. fl.:—carp. 3, styles undivided, staminodes 6; endocarp bony, reniform, finely wrinkled; seed horseshoe-shaped, embryo large, cotyledons thick, semicylindric, no endosperm.—A single species.

Very near to *Cocculus*, but distinguished by the structure of the seed.

P. ovata, *Miers in Hk. f. and Th. Fl. Ind.* i. 203 (1855). **Kad-dukkodi,** *T.*

P. Plukenetii and *P. adversa,* Miers, l. c. 330 and 332. Thw. Enum. 13. C. P. 1050 (1054, 1057).

Fl. B. Ind. i. 105. Wight, Ic. tt. 824, 825 (*Cocculus Plukenetii*), Miers, l. c. t. 135.

A small woody climber, young shoots hairy; l. small, numerous, 1–3 in., ovate-lanceolate, obtuse, mucronate, base rounded or cuneate, glabrous, rather thick, 3-nerved at base, petiole $\frac{1}{2}$–$\frac{3}{4}$ in., pubescent or hairy; fl. pedicellate, in axillary, erect or drooping, hairy racemes usually shorter than the leaves, but the male sometimes longer; sep. oval, inner twice as long; pet. as long as outer sep., bifid, toothed at the base; male fl.:—anth. didymous; fem. fl.:—carp. smooth, styles horizontal; ripe carp. usually solitary, reniform, somewhat compressed, style-scar sub-basal, endocarp finely wrinkled on back.

Dry country, principally near the coast, rather common; Jaffna; Kalpitiya; Mannar; Batticaloa; Kurunegula; Uma-oya Fl. Nov.–Feb.; yellow.

Also on the Carnatic coast of Madras and in Timor and Java.

Gaertner's 'Koon zeylonens.' (Fruct. t. 180, fig. 11) is referred to this in Fl. B. Ind. (following Miers), but I think erroneously. The seed figured seems really to be that of the Kon (*Schleichera trijuga*) as named by Gaertner.

Miers (l. c.) gives C. P. 1054 for his *P. adversa,* which is described as differing by the leaves dilated at base and longer panicles.

8. STEPHANIA, *Lour.*

Twiners; fl. in umbels; male fl.:—sep. 6, pet. 3, stam. 6, monadelphous, filaments forming a central column, anthers in a ring, bursting transversely; fem. fl.:—sep. 3–5, pet. 6, carp. 1, style 3-fid., no staminodes; endocarp strongly tubercled on back; seed almost annular, endosperm scanty, cotyledons slender, $\frac{1}{2}$-terete.—Sp. about 5; 3 in *Fl. B. Ind.*

S. hernandifolia, *Walp. Rep.* i. 96 (1842). **Lunukétiya-wel,** *S.*

Cissampelos hernandifolia, Willd., Moon Cat. 70. *S. intertexta;* Miers, Contrib. iii. 222. Thw. Enum. 13. C. P. 2757.

Fl. B. Ind. i. 103. Wight, Ic. t. 939 (*Clypea*).

A slender twiner, shoots glabrous; l. 2–4 in., round-ovate, acute or obtuse, peltate cordate or truncate at base, glabrous, glaucous beneath, petiole 1–2 in., slender, divaricate; fl. very small, nearly sessile, in small umbels at ends of branches of long-stalked, axillary umbels, bracts subulate; male fl.:—sep. nearly equal, obovate, obtuse, pet. much shorter, staminal column short, summit expanded; fem. fl.:—sep. acute, pet.

shorter, styles subulate; ripe carp. solitary, sessile, small, $\frac{1}{3}$ in., compressed, glabrous, endocarp strongly tubercled on back and sides; seed curved almost into a ring.

Moist country up to 2000 ft.; common. Fl. July; greenish-white. Fruit scarlet.

Also in Peninsular India, Malaya, and tropical Australia and Africa.

The head of fruit looks as if it were the produce of a single flower instead of an umbel of several sessile ones.

9. CISSAMPELOS, *L.*

Twining shrubs; male fl. in lax cymes, sep. 4, pet. 4, coherent into a 4-lobed corolla, stam. 4 (or 5), monadelphous, anth. in a ring, bursting transversely; fem. fl. in crowded umbels, sep. 1, pet. 1, carp. 1, style 3-fid., staminodes none; endocarp tubercled on back; seed horseshoe-shaped, embryo linear, terete, much curved, in axis of plain endosperm.—Sp. about 18; 1 in *Fl. B. Ind.*

C. Pareira,* *L. Sp. Pl.* 1013 (1753), **Diya-mitta,** *S.*
Cocculus orbiculatus, Moon Cat. 69. Thw. Enum. 13. C. P. 169. Fl. B. Ind. i. 103. Bentl. and Trim. Med. Pl. t. 15.

A woody twiner, usually of small size, with straggling branches, young shoots pubescent or tomentose; l. small, $1\frac{1}{2}$–$2\frac{1}{2}$ in., ovate- or reniform-orbicular, acute or obtuse, mucronate, more or less peltate and slightly cordate at base, smooth above, usually stellate-pubescent and pale but sometimes glabrous beneath, ciliate at margin, petioles 1–$1\frac{1}{2}$ in., pubescent; male fl. pedicellate, in small, branched, lax, cymose clusters at end of filiform axillary peduncles shorter than the leaves; fem. fl. in crowded umbels or short racemes, in axils of large, leafy, reniform, hairy bracts, on racemose axillary panicles longer than leaf-petioles; male fl.:—sep. ovate-spathulate, toothed, corolla cup-shaped, lobes half as long as sep., stam.-column slender; fem. fl.:—sep. hairy outside, oval, pet. glabrous, broader and shorter than sep., carp. ovoid, gibbous, silky, style-branches spreading; ripe carp. small, $\frac{1}{8}$ in., ovoid, somewhat compressed, style-scar basal, endocarp transversely ridged and tuberculate, hollowed on sides; seed horseshoe-shaped.

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* So named by Linnæus in the belief that it afforded the 'Pareira brava' of commerce now known to be the produce of *Chondrodendron tomentosum.*

Var. β. **subpeltata,** *Thw. Enum.* 13 and 399. Miers, l. c. 195. C. P. 168.

Fem. inflor. with very small bracts; corolla of male fl. not lobed; fruit rather larger; l. scarcely peltate.

Common throughout the island up to 4000 ft., Var. β. Ratnapura. Fl. throughout the year; greenish-yellow. Fruit red.

Cosmopolitan in all tropical and sub-tropical countries.

Varies greatly in the form of the leaves and the amount of hairiness of the whole plant. Miers considers true *C. Pareira* to be confined to S. America, the Ceylon forms he refers to his species *C. grallatoria*, *C. delicatula*, and *C. subpeltata*.

9. CYCLEA, *Arn.*

Woody twiners; fl. in panicles; male fl.:—sep. 4–5, coherent to form a campanulate calyx, pet. 4–5, coherent into a lobed corolla, stam. 4, monadelphous, anth. bursting transversely; fem. fl.:—sep. 1, pet. 1, carp. 1, style 3-fid., no staminodes; endocarp tubercled on back; seed horseshoe-shaped, cotyledons narrow.—Sp. 3; 2 in *Fl. B. Ind.*

C. Burmanni, *Miers in Hk. f. and Th. Fl. Ind.* 201 (1855). **Kéhi-pittan, Kési-pissan,** *S.*

Herm. Mus. 21. Burm. Thes. 218. Fl. Zeyl. n. 362 (*Dioscorea*). *Cocculus Burmanni*, DC. Syst. Veg. i. 517. Moon Cat. 69. Miers, Contrib. iii. 239. Thw. Enum. 13. C. P. 1049.

Fl. B. Ind. i. 104. Burm. Thes. Zeyl. t. 101. Miers, Contrib. iii. t. 121.

A small woody twiner, young shoots hairy-pubescent; l. 3–4 in., peltate, elongate-deltoid, very acute, truncate or shallowly subcordate at base, undulate at margin, smooth and shining above, more or less pubescent beneath, reticulately veined; fl. pedicellate, in small clusters, on a long, branched, pubescent, axillary panicle; male fl.:—cal. inflated, the lobes shallow, corolla-lobes inflexed, staminal column short; fem. fl.:—sep. hairy, pet. glabrous, truncate, carp. hairy; ripe carp. globular-ovoid, glabrous, white, style-scar sub-basal, endocarp convex on sides, muriculate in lines on back.

Throughout the low moist country; common in waste and cultivated ground. Fl. Sept.; green. Fruit white.

Occurs in Western India, but rarely.

The dense masses of fruit are precisely like miniature bunches of small white grapes. The seeds are figured by Gaertner (Fruct. t. 180, f. 12) under the name of 'Wal-tiedde and Keipisan' among the 'Barbaræ' at the end of the book.

C. peltata, Hk. f. and Th., is given for Ceylon in Fl. B. Ind. i. 105. This rests on a poor specimen (in bud) of Walker's (No. 194) in the Kew Herbarium labelled *Clypea Arnottii*, Miers. Miers, however, quotes this number (Contrib. iii. 239) under *C. Burmanni.* The species can be separated only by the slight differences in their flowers; the leaves are nearly indistinguishable, those of *C. peltata*, however, being rather broader.

VI.—BERBERIDEÆ.

Shrubs; l. simple or transformed into 3-fid spines; fl. regular, bisexual; sep. 6, in 2 rows, imbricate; pet. 6, distinct, in 2 rows, imbricate; stam. 6, distinct, opp. pet.; anth. adnate, opening by 2 upwardly recurved lids; carp. 1, ovules few, basal, erect; ripe carp. fleshy, indehiscent; seeds with copious endosperm, and embryo with flat cotyledons in its axis.

We have but a single species of this chiefly temperate Order.

BERBERIS, *L.*

For characters, see the *Order.*—Sp. about 50; 12 in *Fl. B. Ind.*

B. aristata, *DC. Syst.* ii. 8 (1821).
Thw. Enum. 13. C. P. 2405.
Fl. B. Ind. i. 110. Wight, Ill. t. 8 (*B. tinctoria*). Bentl. and Trim. Med. Pl. t. 16.

An erect, much-branched shrub, 6–10 ft. high, bark pale, smooth, twigs elongated, glabrous; l. in fascicles of 3–6, *i.e.*, on very short branches from the axils of strong 3-branched spines (modified leaves) which are $\frac{1}{2}$–$\frac{3}{4}$ in. long and very sharp, lanceolate or obovate-lanceolate, tapering to base, strongly mucronate, entire or with a few spinous teeth, thick, with prominent veins, petioles very short; fl. in drooping, corymbose racemes or panicles from the leaf-fascicles and somewhat longer than them, pedicels $\frac{1}{3}$ in., glabrous, bracts small, 3, just beneath calyx and looking like outer sep., glabrous; sep. oval, obtuse, spreading, concave, petaloid, the inner row twice as large as the outer; pet. rather longer, obtuse, erect, concave, equal, tapering to base, where are 2 small nectarial glands; stam. slightly connate to base of pet.; ov. smooth, style short, thick, stigma peltate; fruit fusiform or obovoid, nearly $\frac{1}{2}$ in. long, tipped by the persistent style, smooth, soft, 2-seeded; seeds ovoid, somewhat compressed, smooth.

Upper montane region; very common in bushy open places. Fl. May, June, and most other months; bright yellow. Fruit purple, with a white 'bloom' easily rubbed off.

Also throughout the Himalayas from 6000 to 10,000 ft. and in the Nilgiris; the only one of the numerous Himalayan species (besides *B. nepalensis*) which extends into the peninsula. Taken throughout its

range it is a very variable shrub, and some of the more showy varieties are in cultivation in Europe under different names.

The stamens are irritable, and bend over the stigma if touched at the base.

Wood yellow, hard. The root-bark of this species is much used in India as a bitter tonic in fevers, and an extract from the wood is there well known as 'Rasout,' and is found a valuable local application in chronic ophthalmia.

VII.—NYMPHÆACEÆ.

Aquatic herbs; l. large, simple, peltate, usually floating; sep. 4–5, distinct; pet. numerous, in several rows; stam. very numerous, distinct; carp. numerous, either distinct in distant pits in the recept., or confluent with the recept. to form a many-celled ov.; ovules 1–2 or very numerous; fruit either distinct 1-seeded nuts or a spongy berry; seeds either with or without endosperm.

Leaves and fl. floating. Carpels confluent, ovules numerous. Seeds with endosperm (*Nymphæeæ*) 1. Nymphæa.
Leaves and fl. elevated above the water. Carpels distinct, ovules 1-2. Seeds without endosperm (*Nelumbieæ*) . . . . 2. Nelumbium.

The differences between the two genera are sufficient to constitute separate Natural Orders.

1. **NYMPHÆA,** *L.*

Aquatic herbs; l. and fl. floating; sep. 4, petaloid; pet. numerous, in many rows, passing gradually into stam.; stam. numerous, fil. broad, the outer petaloid, anth. adnate, linear, introse; carp. numerous, sunk in and confluent with the fleshy receptacle to form a many-celled ovary, ovules very numerous; stigmas sessile, connate, radiating; fruit a soft, spongy berry, bursting irregularly, with very numerous seeds on the walls of the cells; seeds small, with endosperm, enveloped in a large aril.—Sp. 20; 4 in *Fl. B. Ind.*

Stam. without an appendage beyond the anther.
Fl. white or rose . . . . 1. N. Lotus.
Stam. with a tongue-shaped appendage beyond the anth. Fls. white or blue . . . . . 2. N. stellata.

1. **N. Lotus,*** *L. Sp. Pl.* i. 511 (1753) **Olu, Ét-olu,** *S.*

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* The Egyptian *Lotus* of the earlier botanical writers, and apparently also of Herodotus and other classical authors.

E

Herm. Mus. 19. Burm. Thes. 173. Fl. Zeyl. n. 194. Moon Cat. 41. Thw. Enum. 14. C. P. 1020.
Fl. B. Ind. i. 114. Wight, Ill. i. t. 10 (*N. rubra*).

Rootstock short, erect, roundish, tuberous; l. on very long, erect, cylindrical, submerged petioles, blade horizontal, floating, peltate, 6–8 in. diam., sagittate-rotundate, very obtuse, with a narrow or wide sinus 3 in. deep at base, coarsely and sharply sinuate-dentate, smooth above, more or less densely and finely velvety-tomentose beneath, with the veins very prominent; fl. solitary, very large, 5–7 in. diam., on very long, usually pubescent, peduncles; sep. oblong, obtuse, ribbed, glabrous or pilose externally; pet. about 12, oblong or oval-oblong, obtuse, spreading; stam. about 40, anthers without appendages, filaments dilated at base; rays of stigma terminating in fleshy, club-shaped, incurved appendages; fr. 1¼ in. diam., globular, fleshy, green, crowned with erect, connivent, stiff, persistent sep., cells (about 15) closely crowded with seeds; seeds ovoid-globular, ribbed with vertical lines of little tubercles and very minutely transversely striate, aril white, transparent.

Var *β*. **pubescens,** *Willd. Sp. Pl.* ii. 1154 (sp.). C. P. 1019.

L. more densely tomentose-pubescent beneath; fl. smaller 3–4 in. diam.; sep. acute.

Streams and ponds and tanks throughout the low country up to about 1000 ft.; very common, especially var. *β*. Fl. throughout the year; white, pale or dark rose-coloured, open only in the morning, fragrant. The flower sinks to mature the fruit, which ripens under water.

Equally abundant throughout tropical India, Africa, Java, and the Philippines. There is also a remarkable outlying station in Europe (in Hungary) where there are hot springs.

The small seeds are eaten.

The colour of the flowers varies from pale pink or nearly white to a rich deep rose colour, their size is also very variable; but these differences are not united with any structural ones of sufficient importance to distinguish separate species. Perhaps all our specimens should be referred to *pubescens*.

2. **N. stellata,** *Willd. Sp. Pl.* ii. 1153 (1799). **Manel,** *S.*
Moon Cat. 41. Thw. Enum. 14. C. P. 1021.
Fl. B. Ind. i. 114. Bot. Mag. t. 2058.

Rootstock ovoid, short, erect; l. on long, rather slender, submerged petioles, blade floating, about 5–8 in. diam., sagittate-rotund, very obtuse, with a usually narrow sinus, 2–3 in. deep at base, entire or coarsely sinuate, glabrous on both sides; fl. solitary on long peduncles, 3–6 in. diam.; sep. narrowly oblong-lanceolate, obtuse or subacute; pet. linear-lanceolate, acute or subobtuse; stam. with a tongue-shaped appendage beyond the anth.; stigmatic rays acute, curved

upwards at the ends without appendages; fruit globular; seeds longitudinally striate.

Shallow streams, tanks, and ponds throughout the low country, especially in the dry districts. Fl. all the year; pale blue or violet, open all the day.

Throughout the warmer parts of India, and in tropical and Northern Africa.

This also varies greatly in the size and colour of the flowers. Usually their colour is a very pale whitish-violet, and less commonly a bright light blue; occasionally it is pinkish-purple.

The small starchy ovoid rhizomes are eaten when roasted.

2. NELUMBIUM,* *Juss.*

Aquatic herbs; l. and fl. raised much above the water; sep. 4–5, caducous; pet. 15–18 or more, soon falling; stam. very numerous, with an appendage beyond the anth.; carp. 10–20, separately sunk in the top of a large, obconic receptacle, ovules 1–2, pendulous; ripe carp. distant, 1-seeded; seed filling the carp., cotyledons thick, fleshy, no endosperm. —Sp. 2; 1 in *Fl. B. Ind.*

N. speciosum, *Willd. Sp. Pl.* ii. 1258 (1799). **Nelun,** *S.* **Tamarai,** *T.*

Herm. Parad. Bat. 205; Mus. 66. Burm. Thes. 173. Fl. Zeyl. n. 193. *Nymphæa Nelumbo*, L. Sp. Pl. 511. Moon Cat. 43. Thw. Enum. 14. C. P. 1022.

Fl. B. Ind. i. 116. Wight, Ill. i. t. 9. Herm. Parad. Bat. t. 205.

A large water-herb, with a slender, elongated, branched, creeping stem, with tufts of roots at the nodes; l. very large, erect, petioles very long, rough, with distant prickles, blade peltate, 1–2 ft. diam., horizontal, concave or cupped, rotundate in outline, entire, radiately-veined, glabrous, glaucous; fl. solitary, very large, 4–10 in., on very long, erect, asperous ped., coming off from the nodes of the stem and sheathed at the base; sep. small; pet. 3–5 in., oval, obtuse, finely veined, very concave, at first erect, afterwards spreading; anth.-appendage spathulate; receptacle $\frac{3}{4}$ in. high, spongy, top flat, 1 in. wide; carp. small, seed-like, styles short, exserted, stigma capitate; ripe carp. $\frac{1}{2}$ in., loose in the cavities of the greatly enlarged receptacle, which is now 2–4 in. wide, ovoid, glabrous.

Still water, especially tanks, in the dry country; common; possibly not a native in the moist region. Fl. Feb.–Aug.; white or rose-coloured, sweet-scented.

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* Hermann (Par. Bat. 205) gives Nelumbo as the Sinhalese name.

Throughout India, and extends to Persia, and to China, Japan, the Malay Islands, and tropical Australia ; often planted.

This is the Cyamus or 'Sacred Bean' of ancient Egypt, but is usually called the 'Lotus' by Europeans in the East. It does not now grow in Egypt.

A great ornament to the tanks, often covering many acres with its curious leaves and fruit and magnificent flowers.

The large seeds are an article of food.

Argemone mexicana, L. (Papaveraceæ), a yellow-flowered poppy with variegated green and white prickly leaves, is frequently found as a weed in waste ground, especially in the dry region. It is a native of trop. America, and is figured in Wight, Ill. t. 11.

VIII.—CRUCIFERÆ.

Herbs ; l. alternate, without stip. ; fl. regular, bisexual ; sep. 4, imbricate ; pet. 4 or 0 ; stam. 6 (or 4 or 2), the 4 inner longer, in pairs ; ov. 2-celled by an extension of the placentas forming a false dissepiment, ovules several or numerous, in 1 or 2 rows on parietal placentas ; fruit a 2-celled siliqua or pod, dehiscent by 2 valves, which are completely deciduous ; embryo large, with flat cotyledons and a bent-up radicle ; no endosperm.

Pods cylindrical, seeds ovoid . . . . . . 1. Nasturtium.
Pods compressed, seeds flattened . . . . . 2. Cardamine.

Three species only scarcely represent this vast family, which is mainly characteristic of temperate regions. Two are found in our montane zone, and the other is a weed in cultivated ground. Both the genera are British.

1. NASTURTIUM, *Br.*

Herbs ; sep. 4, spreading ; pet. 4, spreading ; stam. 6 ; fruit a short, cylindrical, slightly turgid siliqua, dehiscent by 2 papery valves, septum very thin, transparent ; seeds numerous, in 2 rows, ovoid.—Sp. 20 ; 4 in *Fl. B. Ind.*

***N. indicum,** *DC. Syst. Veg.* ii. 199 (1821).

Hk. f. and Th. in Journ. Linn. Soc. v. 138. Thw. Enum. 399. C. P. 3747.

Fl. B. Ind. i. 134. Wight, Ill. t. 13 (*N. madagascariense*).

An annual herb, 1–2 ft., erect, branched, glabrous ; l. sessile, lyrate-pinnatifid, irregularly dentate, acute, tapering to base, which is suddenly dilated and auriculate ; fl. small, in elongated, erect, lax racemes terminating stem and branches,

pedicels divaricate, without bracts; sep. obtuse; pet. rather longer than sep., narrowed to base; siliqua $\frac{5}{8}$ in., cylindrical, slightly curved, tipped with the truncate style, ped. very short; seeds numerous, finely muriculate.

A weed in damp cultivated ground; rare, and probably only introduced here. Near Badulla, 1890. The C.P. specimens are labelled 'Peradeniya, 1862;' Gardner and Walker also collected it. Fl. yellow.

Common throughout India, Malaya, China, and Japan.

Nasturtium officinale, Br., the common English watercress, has become naturalised in many small streams in the mountains where intentionally introduced. The name 'Kakkuta-pala' has been given to me by Sinhalese for this, but by Moon (Cat. 13) this native name is applied to his *Anagallis esculenta* from Uva, which is undetermined. The watercress is also given by Moon (p. 47) as found naturalised at Kandy.

2. CARDAMINE, *L.*

Herbs; l. compound; sep. 4; pet. 4 or 0; stam. 2–6; fruit a narrow, linear, compressed siliqua, the 2 valves separating elastically, septum membranous; seeds in 1 row, flattened.—Sp. 60; 11 in *Fl. B. Ind.*

Leaflets 3 . . . . 1. C. AFRICANA.
Leaflets 5-7 . . . . 2. C. SUBUMBELLATA.

1. **C. africana,** *L. Sp. Pl.* i. 655 (1753).

Hk. f. and Th. in Journ. Linn. Soc. v. 144. Thw. Enum. 399. C. P. 1017.

Fl. B. Ind. i. 137. Wight, Ic. t. 941.

A small, perennial herb, with an irregular, creeping rootstock, stems erect or decumbent at base, 6 in.–1 ft. or more, slightly branched, more or less hairy; l. trifoliolate, on very long petioles, lflts. shortly stalked, 1–2 in., ovate-lanceolate, acute, tapering at base (the lateral ones often oblique), coarsely crenate-serrate, nearly glabrous, thin; fl. few in erect racemes at end of stem and branches; sep. oblong, obtuse, glabrous; pet. much longer than sep., oval-oblong, clawed; stam. 6, nearly equal; siliqua erect, $1\frac{1}{4}$–2 in., much tapering to point, smooth, on ped. $\frac{1}{2}$ in. long.

Upper montane zone, in shady places; rather common. Horton Plains; Hakgala; N. Eliya; Palagalla; Maturata. Fl. all the year; whitish or pale sulphur-yellow.

Also in the Nilgiris, but not the Himalayas or elsewhere in Asia, but in South and Trop. Africa and the island of Bourbon.

2. **C. subumbellata,** *Hk. f. in Fl. B. Ind.* i. 138 (1872).

C. hirsuta, L., Hk. f. and Th. in Journ. Linn. Soc. v. 146 (in part); Thw. Enum. 14 (in part). C. P. 2962.

Fl. B. Ind. i. 138.

A small annual herb, 3–12 in., branched, sparingly hairy,

the young parts more so; l. stalked, pinnate, with 2–3 pair of lflts. and a larger terminal one, lflts. very shortly stalked, coarsely and irregularly crenate or lobed; fl. few, very small, on short hairy ped., at first corymbose, afterwards racemose; sep. oblong, obtuse, with few bristly hairs; pet. often 0; stam. 4 (or 2); siliquas shortly stalked, in racemes which are somewhat crowded at the ends, $\frac{5}{8}$–$\frac{3}{4}$ in., slender, slightly tapering at end, compressed; seeds few, 4–8, distant.

Montane zone, in open places; rather common. N. Eliya; Madulkelle; Rangala; Dimbula. Fl. various months; whitish-green.

Also found in the hills of Western India.

I cannot think this is more than a local form of the cosmopolitan *C. hirsuta*, L. The corymbs usually elongate themselves into racemes as in other crucifers, but the flowers are often very few and the racemes thus very short.

Brassica juncea, Hk. f. and Th. *Aba*, S. C. P. 3772. Thw. Enum. 399. This is commonly cultivated about cottages, and is a frequent weed in waste ground. It is grown for the oil from its seeds, and is figured in Duthie's 'Field Crops of India,' t. 41.

Capsella Bursa-pastoris, Moench., the 'Shepherd's Purse' of England, is a frequent garden weed in the hills, having been introduced from Europe.

IX.—CAPPARIDEÆ.

ANNUAL herbs, shrubs (often climbing), or small trees; l. simple or compound, alternate, with or without stip.; fl. regular or irregular, bisexual; sep. 4, distinct (rarely connate into a tube), valvate or imbricate; pet. 4 (rarely 2); stam. indef., sometimes 6 or 4, inserted at base of or half way up gynophore; disk usually absent, rarely developed as a flat expansion or a horn-like process; ov. usually at end of a long gynophore, rarely sessile, 1-celled, ovules numerous on 2 (rarely 4–6) parietal placentas; fruit a 2-valved capsule, or indehiscent and fleshy; seeds with a curved embryo, no endosperm.

Herbs (*Cleomeæ*).
- Stam. inserted on receptacle at base of gynophore . 1. CLEOME.
- Stam. inserted half way up gynophore . . . 2. GYNANDROPSIS.

Woody (*Cappareæ*).
- Sep. combined at base into a calyx-tube . . 3. MÆRUA.
- Sep. distinct.
  - Sep. distant, inserted on edge of expanded recept. 4. CRATÆVA.
  - Sep. biseriate.
    - Stam. 4–6, inserted half way up gynophore . 5. CADABA.
    - Stam. indef., inserted at base of gynophore . 6. CAPPARIS.

Our 19 species are all, with the exception of *Capparis Moonii*, found in the dry region; 3 or 4 of them, however, also extend into the moist region. No species occurs in the montane zone.

1. CLEOME, *L.*

Annual herbs; sep. 4; pet. 4, quite or nearly regular; stam. 6–indef., inserted on receptacle or at base of the gynophore; ov. sessile, or with a short gynophore, 1-celled, ovules numerous on 2 parietal placentas; capsule linear, 2-valved; seeds reniform.—Sp. 80; 12 in *Fl. B. Ind.*

Leaves simple . . . . 1. C. MONOPHYLLA.
Leaves compound.
  Stam. 6.
    Lflts. linear . . . . 2. C. TENELLA.
    Lflts. ovate . . . . 3. C. ASPERA.
  Stam. numerous.
    Fls. pink . . . . 4. C. CHELIDONII.
    Fls. yellow. . . . . 5. C. VISCOSA.

1. **C. monophylla,** *L. Sp. Pl.* 672 (1753).
Herm. Mus. 10. Burm. Thes. 217. Fl. Zeyl. n. 243. Moon Cat. 48. Thw. Enum. 14. C. P. 2702.
Fl. B. Ind. i. 168. Burm. Thes. t. 100, fig. 2 (not good).

Annual, 1–2 ft., stems erect, branched, strongly pubescent; l. $\frac{1}{2}$–3 in., passing gradually into bracts above, lanceolate, acute, entire, rounded at base, finely pubescent on both sides, petioles slender, $\frac{1}{2}$–$1\frac{1}{2}$ in., pubescent; fl. solitary, in axils of leafy bracts, in a long erect raceme, ped. slender, shorter than the bracts; pet. erect, twice as long as sep., long-clawed; stam. 6; pod $2\frac{1}{2}$–3 in., on a very short stalk, linear, straight, cylindrical, striate, pubescent; seeds strongly ridged on back.

Low country, in waste and cultivated ground common; also in rocky places in the dry districts.
Fl. Dec.–March; pale violet-pink.
Also in S. India and in tropical Africa.
Herm. l. c., followed by Burman, erroneously describes the flower as yellow.

2. **C. tenella,** *L. f. Suppl. Pl.* 300 (1781).
Trim. in Journ. Bot. 1885, 142.
Fl. B. Ind. i. 169.

A much-branched annual, 4–6 in., branches spreading, slender, glabrous; l. petiolate, trifoliolate, lflts. sessile, narrowly linear, acute; fl. few, very small; stam. 6; pod about 1 in., without a gynophore, on ped. $\frac{1}{6}$ in., linear, apiculate, glabrous; seeds minute, brownish-yellow, finely muriculate.

Dry region. Only known at present from the sandy coast at

Puttalam and Chilaw, but easily overlooked, and likely to occur in other dry tracts.

Fl. Oct., Nov.; 'purplish.'

Also in S. India, Nubia, and Senegal.

3. **C. aspera,** *Koen. in DC. Prod.* i. 241 (1824).
Thw. Enum. 14. C. P. 1068.
Fl. B. Ind. i. 169. Wight, Ic. t. 287.

A branched annual herb, 6–24 in., branches ascending, glabrous, more or less rough with small distant prickles; l. trifoliolate, on petioles as long as or longer than themselves; lflts. sessile, ovate, acute or subobtuse, finely serrate, glabrous; fl. solitary, very small, on long ped., from axils of upper l., (bracts), forming a very elongated leafy raceme; stam. 6; pods 1–2 in., tapering into the sharp style at apex, and gradually to the slender gynophore at base, linear, often somewhat torulose; ped. slender, ½ in., spreading horizontally; seeds pale brown, strongly ridged on the back.

Low country, in sandy places common; especially near the coast in the dry districts.

Fl. Dec.–March; pink (not 'yellow' as in Fl. B. Ind.).

Also in Southern India.

C. Burmanni, W. and A., is given for Ceylon in Fl. B. Ind. i. 170, the authority being 'Koenig, &c.' There are no specimens in the herbaria of Peradeniya, Kew or the Brit. Mus. *C. dodecandra*, L. is given generally as synonymous with this, and is based on Fl. Zeyl. n. 242; but Hermann's drawing (there is no specimen) seems to be merely 3-foliolate *C. viscosa;* Burman's figure, however (Thes. Zeyl. t. 100 f. 1), shows a different plant, quite glabrous, and Linnæus' description seems to be partly taken from this figure. The species is doubtfully distinct from *C. aspera*, and is perhaps included under above description.

4. **C. Chelidonii,** *L. f. Suppl. Pl.* 300 (1781).
Trim. in Journ. Bot. xxvii. 161.
Fl. B. Ind. i. 170. Wight, Ic. t. 319.

An annual herb, 6–12 in., slightly branched, stem slightly scabrid; l. on very long petioles, 5–9- usually 7-foliolate, lflts. sessile, obovate, very obtuse, entire, densely appressed-hairy on both sides; fl. few, large, ¾ in. diam., ped. ¾–1 in., solitary in leaf-axils; sep. ovate, acute; pet. rounded, not clawed; stam. very numerous, fil. thick; pods 3 in. or more, without a gynophore, linear, tapering; seeds pale brown, slightly muriculate on back.

Dry low country; very rare, and as yet only found at Mineri Tank in the N. Central Prov., in Sept. 1885.

Fl. Sept.; pink.

In several places in South India and also in Java.

[*C. felina*, L. f., is founded on a plant of Kœnig's collecting, and the locality given as 'Zeylona.' But it was probably from the Coromandel coast, as no specimens are known from Ceylon.]

5. **C. viscosa,** *L. Sp. Pl.* 672 (1753). **Wal-aba, Ran-manissa,** *S.*
Herm. Mus. 13. Burm. Thes. 215. Fl. Zeyl. nn. 240 and 241. *C. icosandra*, L. Sp. Pl. 672. Moon Cat. 48. *Polanisia viscosa*, Thw. Enum. 14. C. P. 1073.
Fl. B. Ind. i. 170. Burm. Thes. t. 99. Wight, Ic. t. 2.

An annual herb, 1–3 ft., erect, sparingly branched, softly glandular-hairy and viscid throughout; l. 3–5-foliolate, lflts. sessile, ovate, entire, terminal the largest, lateral often unequal at base, petioles ½–1 in., becoming shorter above and uppermost (bracts) often sessile; fl. ¾ in. diam., on axillary ped. ½ in. long; sep. ovate, acute; pet. twice length of sep., obtuse, long-clawed, 2 approximate, 2 divaricate; stam. 12–24, anth. linear, curled, blue-black; pod 2–4 in., without a gynophore, erect, linear, cylindrical, tipped by glabrous blunt style, very viscous; seeds black, finely ridged on back.

Low country; a very common weed in cultivated ground.
Fl. Jan.–March; lemon-yellow.
Throughout the tropical and warm regions of the world.
Linnæus distinguishes his *C. icosandra* by having quinquefoliate leaves and 24 stamens. There is neither specimen nor figure of this form in Hermann's collection, but Burman's plate well represents it.

2. GYNANDROPSIS, *DC.*

Annual herbs; sep. 4; pet. 4, with long claws; stam. 6, inserted half way up the gynophore; ov. at summit of a very long gynophore, ovules numerous, style none; capsule linear, 2-valved; seeds reniform, embryo helicoid.—Sp. 10; 1 in *Fl. B. Ind.*

G. pentaphylla, *DC. Prod.* i. 238 (1824). **Wéla,** *S.* **Tayir-valai,** *T.*
Herm. Mus. 1, 30. Burm. Thes. 215. Fl. Zeyl. n. 239. *Cleome gynandra*, L. Sp. ed. 1. *C. pentaphylla*, L. Sp. ed. 2. Moon Cat. 47. Thw. Enum. 14. C. P. 2460.
Fl. B. Ind. i. 170. Rheede, Hort. Mal. ix. t. 34. Bot. Mag. t. 1681.

An erect, branched annual, 2–4 ft., stem shaggy, with long, white, spreading hair; l. 5-foliolate, lflts. sessile, broadly ovate, acute, entire, pubescent on both sides and ciliate, pale beneath, terminal largest, 1½–2 in., petioles 2 in., stout, hairy and rough with prickles; fl. at first distinctly corymbose, afterwards in long erect racemes, bracts of 3 sessile leaflets, many empty, ped. over ½ in., viscid-pubescent; sep. narrowly lanceolate, acute, glandular-pubescent; pet. rotundate, with a long, narrow claw, thrice the length of sep., all curved upwards; gynophore 1–1¼ in., slightly curved upwards; stam. inserted about half-way up; ov. on summit of gynophore, linear-

oblong, very glandular, style 0, stigma capitate, flat, ovules numerous; pods 2–3 in., linear, slightly curved, somewhat compressed, viscid-pubescent; seeds helicoid-reniform, rough, dark brown.

Low country; very common in waste and cultivated ground.

Fl. May, June; pet. white or very pale pink with pink claws, gynophore and stam. purplish.

A common weed in all tropical countries.

Develops when bruised a very strong and peculiar scent.

The ovaries are sometimes very small and abortive, the fl. being then practically male. The internodes of the floral axis (gynophore) between the whorls of pet., stam, and ovary are remarkably developed in this plant.

G. speciosa, DC., with large handsome rose-coloured flowers, is a common garden annual, and often appears there spontaneously. It is a native of Central America.

3. **MÆRUA,** *Forsk.*

Shrubs; sep. 4, combined at base into a narrow tube, half as long as the lobes; pet. 4; stam. numerous, inserted at base of long gynophore; ov. 1-celled, with many ovules; fruit elongated, irregularly moniliform, soft; seeds large, strongly muriculate.—Sp. 20; 1 in *Fl. B. Ind.*

M. arenaria, *Hk. f. and Th., Fl. B. Ind.* i. 171 (1872).
M. oblongifolia, Thw. Enum. 15 (non A. Rich). C. P. 1064.
Fl. B. Ind. i. 171 (not given for Ceylon). Hk. Ic. Pl. t. 127.

A straggling shrub, with divaricate branches, bark smooth, pale; l. 1–2 in., oval or oblong-oval, very obtuse or retuse, entire, glabrous, glaucous, somewhat fleshy, petiole $\frac{1}{4}$ in.; fl. few, rather large, in terminal, corymbose racemes without bracts, ped. $\frac{3}{4}$ in., smooth; cal.-lobes $\frac{1}{2}$ in., lanceolate, acute or obtuse, reflexed; pet. distant, $\frac{1}{4}$ in., ovate, acute, erect, veined, green; stam. much exceeding pet., spreading, filaments white, anth. green; gynophore $\frac{1}{4}$ in.; ov. short, truncate; fruit 1–2 in. long, irregularly and interruptedly moniliform, smooth.

Dry or desert country, chiefly near the coast. Trincomalie; Batticaloa; Hambantota; Puttalam; Jaffna. Fl. Feb.–April; green, sweet-scented. Fruit pale yellow.

Also in Southern and Central India.

4. **CRATÆVA,** *L.*

Trees; l. deciduous; sep. 4, inserted on the edge of a large lobed disk; pet. 4; stam. indef., inserted on base of long gynophore; ov. 1-celled, with 2 parietal placentas, ovules

numerous; fruit globose; seed imbedded in pulp.—Sp. 6 or more; 1 in *Fl. B. Ind.*

C. Roxburghii, *Br. in Denh. and Clapp. Travels, app.* 224 (1826).
Lunu-warana, *S.* **Navala, Navilankai,** *T.*
Thw. Enum. 14. C. P. 1067.
Fl. B. Ind. i. 172 (not given for Ceylon). Hk. Ic. Pl. t. 178. Bedd. Fl. Sylv. t. 116.

A small tree, with a much-branched head, young twigs prominently marked with leaf-scars; l. deciduous, 3-foliolate, lflts. shortly stalked, $2\frac{1}{2}$–4 in., broadly oval, acuminate, tapering to base, entire, glabrous, the lateral ones oblique, petioles 3–4 in.; fl. large, 2 in. diam., from the axils of the bud-scales below the new leaves, forming corymbose clusters at the end of the new growths, ped. $1\frac{1}{2}$ in., stout, glabrous; sep. distant, small, ovate-acute, pet. $\frac{3}{4}$–1 in., rounded-oval, with a long, narrow claw; stam. longer than pet., wide-spreading; gynophore 1–$1\frac{1}{2}$ in., exceeding stam.; ov. small, ovoid; fruit a globose berry, on the thickened, woody gynophore now nearly 2 in. long, pericarp hard, smooth; seeds several, imbedded in pulp, nearly smooth, black.

Dry country; rather common. Jaffna; Trincomalie; Hambantota; Kekirawa; Dambulla.

Fl. December, with the young foliage; greenish-white.

Also on the Coromandel coast of Madras, and in many other parts of India, and in Tropical Africa.

In the Fl. B. Ind. this is considered a variety of the Pacific Island plant *C. religiosa*, Forst.

Much planted by the Tamils for the sake of its bitter leaves, used as a stomachic. Wood yellowish-white, fairly hard; used for making sandals.

5. **CADABA,** *Forsk.*

Shrubs or small trees; sep. 4, biseriate, the outer valvate; pet. 2 or 4; stam. 4 or 6, inserted half-way up the gynophore; disk with a horn-like process projecting excentricly opp. the gynophore; ov. 1-celled, with 2 parietal placentas; fruit long, cylindrical, soft, but finally dehiscing by 2 valves; seeds numerous.—Sp. 12; 4 in *Fl. B. Ind.*

Leaves trifoliolate. Pet. 2. Stam. 6 . . . . 1. C. TRIFOLIATA.
Leaves simple. Pet. 4. Stam. 4. . . . . 2. C. INDICA.

1. **C. trifoliata,** *W. and A. Prod.* 24 (1834).
Thw. Enum. 15. C. P. 1066.
Fl. B. Ind. i. 172. Hk. Bot. Misc. iii. t. suppl. 37.

A large, straggling, much-branched shrub, bark smooth, grey; l. 3-foliolate, lflts. very shortly stalked, $1\frac{1}{2}$–3 in., lan-

ceolate, acute at both ends, entire, glabrous, petioles 1–1½ in.; fl. few, in short terminal corymbs, ped. 1½ in., spreading; sep. ovate, 2 outer larger, pubescent outside; pet. 2, large, 1¾ in., roundish-ovate, acute, with a long, slender claw; disk-process ¾ in. long, erect between the pet., hollow, dilated at the end; gynophore 2 in.; stam. 6; ov. small, linear, truncate; fruit about 3 in., linear, cylindrical, blunt, usually curved, soft, smooth, green; seeds reniform, finely muriculate.

Dry low country; rare. Mannar; Trincomalie; Pomparippu. Fl. Feb.; pet. pale yellow, disk-process orange-yellow.

Also in dry districts of South India.

2. **C. indica,** *Lam. Encycl.* i. 544 (1783). **Vili,** *T.*

Thw. Enum. 15. C. P. 1070.

Fl. B. Ind. i. 173 (not given for Ceylon). Burm. Fl. Ind. t. 46, f. 3 (*Cleome fruticosa*) (bad).

A small, straggling tree or shrub, bark smooth, purplish-grey; l. small, simple, shortly stalked, 1–1½ in., oblong-oval, rounded at base, obtuse or retuse, entire, glabrous; fl. rather small, ¾ in., in short, terminal, one-sided racemes; sep. equal, acute, outer concave; pet. 4, slightly longer than sep., oval, obtuse, long-clawed; disk-process ¾ in., curved, declinate, expanded and toothed at end; gynophore ¾ in., much exserted; stam. 4; fruit 1–2 in., linear-oblong, cylindrical, irregularly torulose, smooth; seeds surrounded by a red aril, striate.

Dry or desert country; very rare. Mannar district in several places; 'Kokotaduwa' (Gardner), a locality I do not identify.

Fl. Feb.; pet. nearly white, disk-process violet-pink.

Also in Southern India, where it is common.

6. CAPPARIS, *L.*

Trees or shrubs, erect or more usually climbing, generally with 2 stipular thorns at base of petioles; sep. 4, biseriate; pet. 4, imbricate; stam. indef. (rarely few), inserted at very base of long gynophore; ov. 1-celled, with 2–6 parietal placentas, ovules numerous; fruit hard or fleshy, indehiscent; seeds imbedded in pulp, embryo helicoid.—Sp. about 120; 31 in *Fl. B. Ind.*

Fls. solitary, axillary, or corymbosely arranged at ends of branches.
Shrubs.
Fruit ovoid, soft, scarlet . . . . . 1. C. ZEYLANICA.
Fruit globose, hard, brown . . . . . 2. C. DIVARICATA.
Climbers.
Fl. 4–5 in. Young branches smooth . . 3. C. MOONII.
Fl. 1½ in. Young branches finely tomatose . 4. C. ROXBURGHII.
Small tree . . . . 5. C. GRANDIS.

Fls. in simple umbels.
Shrub . . . . 6. C. PEDUNCULOSA.
Climbers.
Umbels solitary on short peduncles . . 7. C. SEPIARIA.
Umbels numerous on long peduncles, forming a large panicle . . . . . 8. C. FLORIBUNDA.
Fls. supra-axillary, 1–3 in a vertical line.
Young shoots supra-tomatose. Fl. 1½ in. . 9. C. HORRIDA.
Young shoots, glabrous. Fl. ½ in. . . 10. C. TENERA.

1. **C. zeylanica,** *L. Sp. Pl. ed.* 2720 (1762). **Kattoddi, Vennachchi,** *T.*

Herm. Mus. 7. Burm. Thes. 53. Fl. Zeyl. n. 210 (in part). Moon Cat. 41. *C. brevispina*, Thw. Enum. 15. C. P. 1059, 1060, 1062, 2509.
Fl. B. Ind. i. 174. Hook. Ic. Pl. t. 126.

A much-branched shrub, young shoots glabrous; l. 1½–4 in., lanceolate, ovate-lanceolate, or oblong-lanceolate, acute, entire, glabrous, rather thick, reticulate, venation prominent, petioles short, usually with 2 small, straight, sharp, persistent, stipular spines; fl. large, 1¾–2 in. diam., solitary, axillary or 2 together at ends of branchlets, ped. about 1 in.; sep. nearly equal, very concave; pet. 3 or 4 times as long, oblong-lanceolate, very obtuse, undulate, the lower pair spreading, the upper pair approximated; gynophore as long as stam.; ov. oblong, with 4 placentas, ovules numerous, stigma capitate; fruit irregularly ovoid, 2½ in. long, 1¼ in. broad, pointed or blunt, on a stalk ½ in. long, smooth, shining, soft; seeds immersed in a white, creamy pulp, sub-reniform, with a thick, white, waxy coat (aril ?), testa thin, brittle, dark brown.

Dry country; common.

Fl. March–July; white, the 2 upper pet. usually with a basal blotch of yellow, afterwards purple; anth. pale blue. Fruit bright orange-pink, very conspicuous.

Also common in Southern India.

The leaves vary greatly in width, but the varieties based on their forms are connected by intermediate states. The coloured patch at the base of the upper petals may be either yellow, pink, dull purple, or crimson, or either in combination, as seen at different stages of growth.

Some of Hermann's specimens are doubtful.

The green fruit is sliced, dried, cooked, and eaten.

C. Heyneana, Wall.—To this species are referred, in Fl. B. Ind. i. 174, some specimens in Herb. Kew included under C. P. 2509 (which is not represented in Hb. Perad.), but they are scarcely sufficient to warrant a certain reference. An imperfect specimen from Mandagalla Tank, E. Prov., sent by Mr. Nevill, may possibly be this; he describes it as forming a round-topped tree, and it has pubescent young foliage and smaller flowers.

2. **C. divaricata,** *Lam. Encycl. Meth.* i. 606 (1783).
C. stylosa, DC., Thw. Enum. 15. C. P. 1072.
Fl. B. Ind. i. 174 (not given for Ceylon). Wight, Ic. t. 889 (?).

A shrub or small tree, much-branched; l. about 2 in., broadly oval, obtuse or subacute, entire, glabrous, rather thick, venation strongly marked on both surfaces, petiole short, stipular spines short, sharp; fl. (not seen) solitary, axillary; fruit large, $1\frac{3}{4}$ in. long, $1\frac{1}{2}$ in. diam., with a short, blunt beak $\frac{1}{4}$ in. long, surface rough, not ribbed; ped. much-thickened and woody, stiffly hooked or curved downward, pericarp thick; seeds numerous, in firm white pulp, $\frac{2}{8}$ in., ovoid, smooth, purplish-brown.

Dry districts; apparently very rare. Pomparippu (Gardner); Panuwa Pattu, E. Prov. (Nevill). Fl. ?

Also occurs in S. India.

I have not seen flowers of this species. In Wight's figure (l. c.) they are represented with 6 linear apiculate ciliate pet., and an ovary with 6 parietal placentæ, a very thick style, and a hairy capitate stigma. This shows also much narrower leaves, and may be different from our plant.

3. **C. Moonii,** *Wight, Ill.* i. 35 (1840).
Thw. Enum. 16. C. P. 2415.
Fl. B. Ind. i. 175.

A very large woody climber, stems attaining 8 in. diam., much-branched, bark smooth, young branches shining; l. $3-4\frac{1}{2}$ in., oval-oblong or oblong-lanceolate, obtuse or acute, apiculate, entire, rather thick, glabrous, shining, ped. $\frac{1}{2}$ in., stipular spines sharp, hooked; fl. few, very large, 4–5 in. diam., 3–6 together in corymbose clusters at end of branches, ped. over 2 in., stout; sep. 1 in., orbicular, very concave, much imbricated; pet. 2 in., spreading, pubescent on upper surface; stam. very numerous, erect, 3–4 in. long; gynophore slightly longer; ov. urceolate, glabrous, with 4 placentas, ovules numerous, style short; fruit very large, 4 in., subglobose, pointed, on much thickened woody stalk; seeds numerous, large, $\frac{3}{4}$ in., rotundate, pinkish, cotyledons foliaceous.

Moist country up to 3000 ft.; rather rare. Uva (Moon); Hunasgiriya; Panwila; Alagalla. Fl. March, April; pure white.

Has also been found in Concan, W. India.

Extremely ornamental when in flower.

Wight erroneously quotes *C. grandis*, Moon Cat., for this.

4. **C. Roxburghii,** *DC. Prod.* i. 247 (1824). **Púnai-virándi,** *T.*
Thw. Enum. 15. C. P. 1065.
Fl. B. Ind. i. 175 (not given for Ceylon). Wight, Ic. t. 1048.

A large woody climber, young branches finely tomentose; l. 2–3 in., oval, acute or obtuse, often apiculate at apex, acute at base, glabrous, petioles $\frac{1}{2}$ in., slender, stipular spines hooked or absent; fl. $1\frac{1}{2}$ in. diam., in corymbs of 4–10 at ends of branches, ped. $1-1\frac{1}{4}$ in., stiff; sep. $\frac{1}{2}$ in., rotundate, cupped,

much imbricated, glabrous; pet. $\frac{3}{4}$ in., broadly obovate-cuneate; stam. $1\frac{1}{2}$ in. long, erect; gynophore rather longer; ov. urceolate, placentas 5, ovules numerous; fruit $1\frac{1}{2}$–2 in., globose, apiculate, on a woody stalk $2\frac{1}{2}$ in. long; seeds numerous, $\frac{3}{5}$ in. diam.

Dry low country; rather rare. Trincomalie; Puttalam; Hangurankette; Kekirawa; Mannar. Fl. August; white.
Also in Southern India.

5. **C. grandis,** *L. f. Suppl. Plant.* 263 (1781). **Mudkondai,** *T.*
Moon Cat. 41. Thw. Enum. 16. C. P. 1071.
Fl. B. Ind. i. 176.

A small tree, young shoots palely tomentose; l. 2–3 in., rhomboidal-oval, acute at both ends or obtuse at apex, glabrous above, finely tomentose-pubescent beneath, venation reticulate, prominent, petioles short, pubescent, no stipular spines; fl. $\frac{3}{4}$ in. diam., on slender, pubescent, spreading ped. $\frac{3}{4}$–1 in. long, crowded in corymbs at end of branches; sep. pubescent outside; pet. narrowly obovate; gynophore $\frac{3}{4}$ in.; ov. glabrous, apiculate; fruit (not seen ripe) 'subglobose, size of a nutmeg,' smooth, 2–6-seeded, purple.

Dry low country in forest; rare. (C. P. 1071 is without locality). Kambukkan-ar, E. Prov. (Capt. Walker); Anaradhapura; Mannar. Fruit collected in Ceylon by Koenig. Fl. September.
Also in S. India.

6. **C. pedunculosa,** *Wall. Cat. n.* 6993 (1828). **Píchchuvilátti,** *T.*
Thw. Enum. 16. C. P. 1069.
Fl. B. Ind. i. 176 (not given for Ceylon). Hook. Ic. Pl. t. 128.

A much-branched, spreading shrub, with wiry, pubescent branches; l. numerous, very shortly stalked, closely placed, ovate-rotundate, $\frac{3}{4}$–1 in., obtuse retuse or apiculate, glabrous, stipular spines small, hooked; fl. small, $\frac{1}{2}$ in., 2–5 together in shortly stalked, simple, axillary umbels, pedicels 1 in., slender; sep. less than $\frac{1}{4}$ in., glabrous, reflexed; pet. equalling sep., oval; gynophore $\frac{3}{4}$–1 in.; fruit ovoid-globose, $\frac{1}{2}$ in., apiculate, smooth.

Var. β. **longispina,** *Hk. f. and T.* (sp.).

Stipular spines straight, divaricate, $\frac{3}{8}$ in., leaves pubescent beneath.

Dry low country; rare. Chilaw; Haragama; near Nalande. Var. β. Mannar. Fl. March.
Also in a few places in South India.
Specimens from Moon n. 323, collected in 1819, are in Mus. Brit. (*C. myrtifolia*, Br. Ms.).

I have seen only leaves of var. β.; the stipular spines are occasionally straight in the type. The T. name above given refers to this variety.

7. **C. sepiaria,** *L. Syst. Nat.* x. 1071 (1759). **Karunchurai,** *T.*
Thw. Enum. 16. C. P. 1063.
Fl. B. Ind. i. 177. Hook. Ic. Pl. t. 123.

A woody, scrambling climber, much-branched, young shoots hairy; l. 1–1¼ in., oval or oblong-oval, retuse, glabrous above, more or less pubescent or tomentose beneath, petiole very short, tomentose, stipular spines hooked; fl. small, ⅓ in., numerous, crowded, in stalked, terminal, or axillary umbels, ped. ½ in., slender; sep. oval, reflexed; pet. a little longer than sep., oblong; gynophore ¼–⅓ in.; ov. oblong, pubescent, placentas 2; fruit ⅜ in., globose, black.

Var. β. **retusella,** *Thw. Enum.* 16, 400 (Sp.). C. P. 2550.

L. linear-oblong, or narrowly ovate, tapering to retuse apex, glabrous or nearly so beneath; fl. corymbose rather than umbellate.

Dry country, common. Jaffna; Hambantota, abundant; Puttalam; Anuradhapura; Kekirawa; Mannar. Var. β. Maturata (Moon); Haragama; Matale; Kekirawa (the latter a very extreme form). Fl. July; white.

Throughout India; also in the Philippines; Var. β. endemic.

8. **C. floribunda,** *Wight, Ill.* i. 33 (1838).
C. P. 3766.
Fl. B. Ind. i. 177. Wight, Ill. i. t. 14.

A large woody climber, young twigs glabrous; l. 3–3½ in., oblong-lanceolate, obtuse at both ends, retuse, apiculate at apex, glabrous, petiole ⅜ in., stipular spines, small, broad-based, very decurved (often absent); fl. small, numerous, in numerous dense umbels on long peduncles from axils of upper leaves and ends of branches, forming together a large terminal panicle, pedicels about ½ in.; sep. reflexed in fl., pet. oblong, gynophore ⅓ in.; stam. 8, erect; fruit globose, ¾ in. diam.

Dry country, very rare. I have only seen it from Haragama, where the C. P. specimens were gathered in 1862. Fl. white.

Also in Malabar, Tenasserim, and the Philippines.

9. **C. horrida,** *L. f. Suppl. Plant.* 264 (1781). **Welangiriya,** *S.*
Thw. Enum. 15. C. P. 1058.
Fl. B. Ind. i. 178. Wight, Ic. t. 173.

A climbing shrub, with long, divaricate branches, young shoots with rufous, scurfy tomentum; l. oval-lanceolate or oblong, obtuse, strongly apiculate, tomentose when young, afterwards glabrous and shining, petioles short, stipular spines recurved; fl. rather large, 1½ in. diam., supra-axillary, solitary or 2 or 3 together above one another in a vertical line, ped.

$\frac{1}{2}$–$\frac{3}{4}$ in., tomentose; sep. rufous-tomentose outside; pet. twice as long, hairy; stam. much longer than pet.; gynophore 1 in.; ov. ovoid, apiculate, with 4 placentas; fruit subglobose, $1\frac{1}{4}$ in. diam., on a greatly thickened stalk, many-seeded.

Dry low country, rather rare. Jaffna; Anuradhapura; Uma-oya; Hangurankette; first collected by Koenig. Fl. March, April; Pet. white, stamens crimson.

Distributed through the Indian Peninsula, Malaya, and the Philippines.

10. **C. tener,** *Dalz. in Kew Journ. Bot.* ii. 41 (1850), var. **zeylanica,** *Hk. f. and Th., Fl. B. Ind.* i. 179 (1872).
C. tetrasperma, Thw. Enum. 15. C. P. 614.
Fl. B. Ind. i. 179.

A climbing shrub, with slender, glabrous branches; l. $1\frac{1}{2}$–4 in., oval, acuminate or slightly caudate, glabrous, petiole very short, stipular spines small, hooked; fl. small, $\frac{1}{2}$ in. diam., supra-axillary, 1–3 in a vertical line, ped. $\frac{1}{2}$ in., slender; sep. deflexed, oval, tomentose at margins; pet. a little longer than sep., oblong, hairy outside; stam. about 20, $\frac{5}{8}$ in.; gynophore about $\frac{1}{2}$ in.; ov. glabrous, with 2 placentas; fruit globose, $\frac{3}{8}$ in. diam., usually 4-seeded.

Low country, very rare. Matale; Hangurankette. Specimens from Moon, 'Feb. 1819,' in Mus. Brit. (*C. glabella*, Br. MS.). Fl. May, June.

Also in South-western India, E. Bengal, and Burma.

X.—VIOLACEÆ.

HERBS, shrubs, or trees; l. simple, alternate, with stip.; fl. regular or irregular, bisexual; sep. 5, distinct, imbricate, persistent; pet. 5, distinct, equal or unequal, imbricate or contorted; stam. 5, anth. distinct or connate; disk annular or none; ov. 1-celled, with few or numerous ovules inserted on 3 parietal placentas; fruit a 3-valved capsule; seeds few, embryo straight, in fleshy endosperm.

Herbs.
  Sep. produced at base, anth. connate . . . 1. VIOLA.
  Sep. not produced at base, anth. distinct . . . 2. IONIDIUM.
Shrubs or trees . . . . 3. ALSODEIA.

All the three species of *Viola* and one of *Alsodeia* are montane; *Ionidium* and the other two species of *Alsodeia* are low-country plants.

1. VIOLA, *L.*

Herbs; fl. solitary; sep. 5, with a backward projection at the base; pet. 5, the lowest larger, and produced into a spur

at the base; stam. 5, the 2 lower spurred at the base, anth. connate; ov. 1-celled, ovules numerous on 3 parietal placentas; stigma obtuse, more or less 3-lobed; capsule 3-valved; seeds several, nearly globose.—Sp. about 100; 11 in *Fl. B. Ind.*

Leaves linear-oblong, dilated at base . . . . . 1. V. PATRINII.
Leaves ovate with cordate base
  Glabrous. Capsule linear-oblong . . . . . 2. V. DISTANS.
  Hairy. Capsule subglobose . . . . . . 3. V. SERPENS.

1. **V. Patrinii,** *DC. Prod.* i. 293 (1824).
V. hastata, Moon Cat. 17. *V. Walkerii*, Wight, Ill. i. 42. Thw. Enum. 20. C. P. 1087.
Fl. B. Ind. i. 183. Wight, Ill. i. t. 18 (*V. Walkerii*).

A perennial herb, with a short, tufted, woody rootstock without stolons; l. all radical, erect, very variable, usually oblong or linear-oblong, obtuse at apex, dilated below into a broad triangular base, and thence very gradually tapering into petiole, coarsely crenate-serrate, glabrous, petioles slender, varying from $\frac{1}{4}$–6 in., winged in upper part, glabrous; fl. on slender erect ped. exceeding the leaves, bracts linear; sep. lanceolate, acute, glabrous; pet. $\frac{1}{2}$ in., oval-obtuse, with short claws, spur inflated; stigma dilated, 3-lobed; capsule twice the length of persistent sep., valves straight.

Montane zone from the highest elevations down to 3000 ft.; rather common. Fl. Jan.

Distributed widely through Northern and Central Asia to Japan; in India only on the mountains.

Wight figures the flowers pale lemon-yellow.

2. **V. distans,** *Wall. Cat. n.* 4022 (1828).
V. Wightiana, var. *glabra*, Thw. Enum. 20. C. P. 153 (part).
Fl. B. Ind. i. 183.

A perennial herb, with a stout, erect rootstock giving off numerous long, trailing branches (stolons), rooting at nodes and bearing leaves and flowers, whole plant glabrous; l. 1–1$\frac{1}{2}$ in., ovate-cordate, acute, shallowly crenate-serrate, petioles longer than leaves, stip. free, very acute, fimbriate; fl. about $\frac{1}{2}$ in., ped. axillary, rather longer than leaves, bracts minute; sep. lanceolate, acute; pet. oval-oblong, spur not inflated; stigma truncate, obscurely 3-lobed; capsule $\frac{3}{8}$ in., linear-oblong, acute, glabrous, valves straight.

Upper montane zone in wet places; rather rare. Abundant on Nuwara Eliya Plain. Fl. April; pale violet, lower pet. with darker veins, spur green.

Also in the Himalaya, Nilgiri, and Pulney Mountains.

3. **V. serpens,** *Wall. in Roxb. Fl. Ind.* (ed. Carey) ii. 449 (1824).
V. crenata, Moon Cat. 17. *V. Wightiana*, var. *pubescens*, Thw. Enum. 20. C. P. 153 (part).
Fl. B. Ind. i. 184. Royle, Ill. t. 18, fig. 1.

A perennial herb, with a slender, ascending rootstock, usually giving off long, prostrate, glabrous, rooting branches; l. 1–1½ in., broadly cordate-ovate, acute or obtuse, crenate-serrate, more or less hairy on both surfaces, petioles usually longer than l., hairy especially at upper part, stip. free fimbriate; fl. ½–⅔ in., nodding, ped. longer than l., slightly hairy, bracts setaceous; sep. linear-lanceolate, very acute; pet. oblong, spreading, spur not inflated, stigma oblique; capsule ¼ in., subglobose, pubescent, valves dehiscing irregularly.

Montane zone descending to 4000 ft.; common. Moon gathered it on Adam's Peak. Fl. most of the year; pale violet-blue or nearly white.
All the Indian mountains, and extends to China and Java.
This is the common hill-violet of Ceylon, and very like some forms of the wild *V. canina* of Europe.

2. IONIDIUM, *Vent.*

Semi-shrubby herbs; fl. solitary; sep. 5, not produced at base; pet. 5, the lowest much the largest, spurred at base; stam. 5, distinct, 2 lower spurred at the base, anthers with a tongue-like appendage; ov. 1-celled, with 3 parietal placentas, ovules few; capsule 3-valved.—Sp. 40; 2 in *Fl. B. Ind.*

Leaves few, spreading acute . . . . . 1. I. SUFFRUTICOSUM.
Leaves very numerous, imbricate, acuminate . 2. I. RAMOSISSIMUM.

1. **I. suffruticosum,** *Ging. in DC. Prod.* i. 311 (1824). **Oritad-támarai,** *T.*
Herm. Mus. 47. Fl. Zeyl. n. 318 and 317. *Viola suffruticosa* and *V. enneasperma*, L. Sp. Pl. 937; Moon Cat. 17. Thw. Enum. 20. C. P. 76.
Fl. B. Ind. i. 185. Wight, Ill. t. 19. Burm. Thes. t. 85.

A small, semi-shrubby herb, with many diffuse or ascending branches, glabrous or finely pubescent; l. linear or linear-lanceolate, 1–1½ in., sessile or nearly so, entire or very shallowly crenate-serrate, stip. minute, subulate; fl. solitary, axillary, ped. ½ in., erect, slender; sep. linear, acute; pet. unequal, 2 upper ones oblong, slightly longer than sep., 2 lateral longer, falcate, lowest twice as long as lateral ones, ½ in., with an oval convolute limb and a long claw; capsule subglobular, apiculate, smooth, valves papery; seeds white, longitudinally striate.

Low country; common, especially in the dry districts in open ground. Fl. all the year; rose-pink.

Throughout tropical Asia, Africa, and Australia.

Moon (Cat. 41) gives as the Sinhalese name for this 'Yotu-wenna.'

Burman's figure above quoted was made from a specimen collected by Hartog, and is referred to *Polygala* by him (Thes. 195). Burm. f. named it *P. Thea* (Fl. Ind. 154) because a similar plant had been sent from Java as *Thea*. Linn. (Mant. 260) gives the name *P. theezans*, and does not quote Ceylon as a locality at all. The *V. enneasperma*, L. is merely a diffuse form with nearly entire leaves.

2. **I. ramosissimum,** *Thw. Enum. Pl. Zeyl.* 21 (1858).
Thw. Enum. 21. C. P. 1084.
Fl. B. Ind. i. 186.

A small under-shrub, 6–8 in. high, with numerous slender, ascending, woody branches; l. very numerous, crowded, imbricated, erect, sessile, very narrowly linear, acuminate, entire, margins slightly recurved; fl. and fruit as in *I. suffruticosum.*

Low country; very rare. Maturata (Moon); Banks of the Mahaweli at Haragama; Medamaha-nuwara. Fl. July, August, and Feb.; pale violet-pink.

Endemic.

3. ALSODEIA, *Thouars.*

Trees or shrubs; fl. solitary or fascicled, with many bracts; sep. 5, equal; pet. 5, equal; stam. 5, equal, inserted within a fleshy disk, fil. very short, anth. distinct or connate, with a long, tongue-like appendage; ov. 1-celled, with 3 parietal placentas, ovules 1 or 2 to each placenta, stigma 3-lobed; capsule 3-valved, seeds 3.—Sp. about 40; 11 in *Fl. B. Ind.*

Anthers distinct, disk annular
  Leaves acute, stipules persistent . . . . . 1. A. ZEYLANICA.
  Leaves obtuse, stipules caducous . . . . . 2. A. DECORA.
Anthers connate, disk of 5 separate scales . . . 3. A. VIRGATA.

1. **A. zeylanica,** *Thw. Enum. Pl. Zeyl.* 21 (1858).
Pentaloba zeylanica, Arn. in Mag. Zool. Bot. ii. 543. C. P. 2669.
Fl. B. Ind. i. 187. Bedd. Fl. Sylv. t. 229.

An erect shrub, 10–12 ft., young shoots pubescent; l. 3–5 in., lanceolate or oval, acuminate, acute, shallowly serrate, glabrous, venation reticulate, conspicuous, stip. free, $\frac{3}{8}$ in., lanceolate, very acute, adpressed to stem.; fl. small, solitary or fascicled, axillary, nearly sessile, surrounded by many small, acute, rufous bracts; sep. lanceolate, acute, striate; pet. twice as long as sep., erect, oblong-linear, acute, recurved at apex; disk 5-lobed; ov. 1-celled with 3 ovules; fruit $\frac{1}{4}$ in., globose, apiculate, smooth; seeds smooth.

Moist low country; rather rare. Hantane (Macrae); Ratnapura. First collected by Wight in 1836. Fl. March; white.

Also in Malabar and Cochin.

The Fl. B. Ind. describes the leaf-axils as bearded beneath; this is never the case in Ceylon specimens.

2. **A. decora,** *Trim. in Journ. Bot.* xxiii. 203 (1885).
C. P. 4006.

A small tree, young twigs finely pilose; l. oblong-lanceolate often slightly trapezoid, somewhat acuminate, acute at base, obtuse or emarginate at apex, shallowly crenate-serrate in the upper half, reticulate venation prominent, petioles $\frac{1}{4}$ in., stip. subulate, very early caducous; fl. small, $\frac{1}{8}$–$\frac{1}{6}$ in., shortly pedicelled, in very short, contracted, axillary racemose fascicles, bracts numerous, soon falling; sep. lanceolate, subacute, persistent; pet. oblong-strap-shaped, scarcely twice as long as sep., persistent; fruit globose, apiculate; seeds mottled.

Montane zone; rare. Hewahette near the Great Western mountain (Thwaites); Nitre Cave District. Fl. Sept.
Endemic.

3. **A. virgata,** *Hk. f. and Th. in Fl. B. Ind.* i. 189 (1872). [Plate V.]
Scyphellandra virgata, Thw. Enum. 21. C. P. 1085.
Fl. B. Ind. i. 189.

A small shrub, with long, straight, virgate, pubescent twigs; l. numerous, very variable, $\frac{1}{4}$–$1\frac{1}{4}$ in., the smaller ones in fascicles, very shortly stalked, oblong or oblong-lanceolate, obtuse or subacute, faintly serrate, glabrous, stip. very small, acute; fl. solitary or in small axillary fascicles, pedicels short, very slender; sep. subacute; disk of 5 scales (not annular); stam. with nearly sessile anth. coherent by their margin; style long, stigma 3-fid; fruit globose, with a long apiculus; seeds cream-coloured.

Dry and intermediate country; rather rare. Mineri (Gardner); Bintenne; Uma-oya; Atakalan Korale; Lenadore, near Dambulla. Fl. July.
Endemic.

XI.—BIXACEÆ.

Trees or shrubs, sometimes spinous; l. alternate, simple, without stip; fl. regular, bisexual or unisexual and diœcious; sep. 4–8, usually 5, distinct, imbricate (rarely completely connate); pet. 4–6, usually 5, imbricate or contorted, or 0; ov. 1-celled, with 3–7 parietal placentas (in *Flacourtia* pro-

longed to meet in centre and form false dissepiments), ovules 1, few or numerous; fruit an indehiscent berry, rarely 3-valved; seeds few, with or without an aril, embryo with foliaceous cotyledons in oily endosperm.

Pet. without an adnate scale (*Flacourtiæ*).
  Fl. bisexual, with petals
    Stam. indefinite . . . . 1. SCOLOPIA.
    Stam. 5 . . . . 2. ERYTHROSPERMUM.
  Fl. diœcious, pet. 0
    Spinous. Sep. slightly imbricate . . 3. FLACOURTIA.
    Not spinous. Sep. valvate . . . . 4. ABERIA.
Pet. with an adnate scale within (*Pangieæ*)
  Cal. undivided . . . . 5. TRICHADENIA.
  Sep. 5 . . . . 6. HYDNOCARPUS.

With the exception of one *Scolopia*, all our species are inhabitants of the low country only, of which four are confined to the humid and one to the dry region respectively, and the rest occur in both.

Cochlospermum Gossypium, DC. Thw. Enum. 41. *Kinihiriya* or *Ela-imbul*, S., *Kongu*, T. This is frequently found on rocky hills in the dry districts, but usually near the temples so often placed in such localities, and planted for the sake of the large splendidly golden-yellow flowers which are used for offerings. This is called *Cistus lobatus* by Moon (Cat. 42). It is considered to be native to the dry hills of Central India, whence it has been introduced to other parts of the East. There are specimens in Hermann's herb., and it is *Bombax gossypinum*, L. (Fl. Zeyl. n. 222).

Bixa Orellana, L. is included in Thw. Enum. p. 16, and is C. P. 2821. It is the annatto dye-plant, and called *Kaha* by the Sinhalese, who often grow it in their gardens, but more for the ornament of its pretty pink or white flowers than for the colouring matter of its seeds. It is figured in Bedd. Fl. Sylv. t. 79, and is said there to be quite naturalised in the Madras Presidency. A native of tropical America.

1. SCOLOPIA, *Schreb.*

Trees, usually with woody spines; l. without stipules; fl. bisexual; sep. 4–6; pet. 4–6, smaller than sep., imbricate; stam. numerous, inserted on expanded receptacle, connective produced beyond anth.; ov. 1-celled, with 3 parietal placentas, ovules few, pendulous; fruit a berry, surrounded at base by persistent sep., pet., and stam., 2–4-seeded.—Sp. 15; 4 in *Fl. B. Ind.*

Fruit green when ripe.
  Leaves acuminate-caudate, 2½–4½ in.. . . . 1. S. ACUMINATA.
  Leaves not acuminate, 1–2 in. . . . . . 2. S. CRASSIPES.
Fruit bright scarlet . . . . 3. S. GÆRTNERI.

1. **S. acuminata,** *Clos in Ann. Sc. Nat. ser.* 4, viii. 251 (1857). **Katukenda,** *S.*

Thw. Enum. 17, 400. C. P. 1077.
Fl. B. Ind. i. 191 (under *S. crenata*). Bedd. Fl. Sylv. t. 78 (*S. crenata*)?

A small tree, with smooth, rufous-grey bark, branches with straight simple spines when young, afterwards unarmed; l. 2½–4½ in., oval, tapering to the short petiole, very acuminate or caudate, obtuse, shallowly repand-dentate, rather thick, glabrous and shining on both sides; fl. numerous, articulated to stout ped., in lax, axillary, racemose panicles shorter than the leaves; sep. 5–6, broad, obtuse; pet. 5–6, smaller; disk a ring of numerous orange-coloured papillæ; stam. and style ¼ in.; fruit globular-ovoid, ½–¾ in., apiculate, fleshy, green.

Low country both moist and dry, up to 1500 ft.; rather common. Hantane (Gardner); Deltota; Nillembe; Hangurankette; Dambulla; Alut-oya. Fl. May–August; pinkish-white.

Also in S. India and S. China.

Specimens from the dry region have the leaves less acuminate and smaller, and a smaller fruit, and form a distinct variety. Many of the fls. are barren, disarticulating from the pedicels and falling away without fertilisation.

This is not distinguished in Fl. B. Ind. from *S. crenata*, Clos, of the S. of India. To that species are also referred the cultivated specimens (C. P. 3526) named *S. chinensis*, Clos, in Thw. Enum. 400 (*S. Arnottianus*, Thw. Enum. 16). This is quite different from the present species, and is not known wild in Ceylon, though common in the Peradeniya Gardens. It has a small pulpy dull purple berry the size of a pea.

2. **S. crassipes,** *Clos. in Ann. Sc. Nat. ser.* 4, viii. 251 (1857).
Phoberos Hookerianus, Wight MS., Thw. Enum. 17. Thw. Enum. 400. C. P. 629.
Fl. B. Ind. i. 191 (under *S. crenata*).

A very large tree, branches with spines when young; l. 1–2 in., lanceolate or oval-oblong, tapering to the short petiole, obtuse, entire or slightly crenate, coriaceous, glabrous, veins prominent beneath; fl. on very stout ped., crowded in dense axillary racemes shorter than the leaves, bracts conspicuous, subulate; sep. and pet. 5–6; fruit subglobose, usually broader than long, ½ in., apiculate, fleshy, green.

Montane region down to about 3000 ft.; common. N. Eliya; Maturata; Dolosbagie; Galagama; Deltota. Fl. April, May; white.

Endemic.

This may possibly be a montane state of the last; with it, it is included under *S. crenata* in Fl. B. Ind.

3. **S. Gærtneri,** *Thw. Enum. Pl. Zeyl.* 400 (1864). **Katukurundu,** *S.*
Fl. Zeyl. n. 410 (*Rhamnicastrum*). *Limonia pusilla*, Gaertn. Fruct. i. 297. *S. pusilla*, Willd. Sp. Pl. ii. 981 (1799); Moon Cat. 39. *Phoberos Gærtneri*, Thw. Enum. 17. C. P. 64, 1076, 2497.
Fl. B. Ind. i. 191. Gaertn. Fruct. i. t. 58. f. 4 (fruit).

A moderate-sized tree, bark grey, young branches usually armed with slender, axillary spines 1½ in. long, and the trunk with large, woody, compound, branched spines; l. very variable, 1–3 in., on very short ped., oblong-oval or ovate, acute, rounded or cordate at base, obtuse at apex, entire or faintly crenate, sub-coriaceous, glabrous; fl. in lax, simple racemes shorter than or as long as the leaves, ped. ½–⅜ in., slender, bracts minute; sep. and pet. 4–5 (usually 4); no disk; fruit ½ in., ovoid, on a stalk ½ in. long, strongly apiculate, fleshy, bright red.

Low country; common up to 1500 ft., both in moist and dry region. Fl. June–September; white. Fruit bright scarlet.

Endemic.

Willdenow's name *S. pusilla* has long priority, but was rejected by Thwaites as being inapplicable to a tree.

There is much variety in the form of the leaves, and Thwaites divides the species into three varieties, *oblongifolius*, *cordifolius*, and *lanceolatus*, which are not noticed in Fl. B. Ind. The formidable branched divaricate spines on the trunk are very characteristic of this tree.

2. ERYTHROSPERMUM, *Lam.*

Trees; fl. bisexual, in racemes; sep. 5, imbricate; pet. 5; stam. 5; ov. 1-celled, with 3 parietal placentas, ovules few; fruit coriaceous, 3-valved; seeds invested with a scarlet, pulpy aril, endosperm firm, embryo with a long, straight, blunt radicle.—Sp. 8; 1 in *Fl. B. Ind.*

Six species are from Mascarene Islands, and one has been recently found in the Malay Peninsula.

E. phytolaccoides, *Gardn. in Calc. Journ. Nat. Hist.* vii. 9 (1846). [Plate VI.]

Herm. Mus. 67. *Pectinea zeylanica*, Gaertn. Fruct. ii. 136. Thw. Enum. 18. C. P. 468.

Fl. B. Ind. i. 191. Gaertn. Fruct. ii. t. 111, f. 3. Bedd. Ic. t. 195.

A small tree, 20–30 ft., young shoots glabrous; l. 4–7 in., oval or lanceolate, shortly acuminate, acute, entire, glabrous and shining, petiole ⅜–½ in.; fl. nearly ½ in. diam., numerous, in racemes from the upper axils and ends of branches, ped. ⅙ in., slender, bracts minute; sep. oval, glabrous, pet. a little longer, pilose at the base; anth. sagittate; ov. tapering, glabrous; fruit ⅜–⅝ in., nearly spherical, apiculate, rough, pale reddish-purple, splitting tardily into 3 ovate valves; seeds 1–6, when solitary ovoid or globular, when more numerous flattened from mutual pressure, enveloped in a brilliant, scarlet, pulpy aril, testa hard, bluntly muriculate.

Moist low country, rather rare. Between Balangoda and Palma-

dulla (Gardner); Ratnapura; Wattegoda; Pasdun Korale; Morowak Korale; Singha Rajah Forest. Fl. Feb.–April; white.

Endemic.

A native guide in Pasdun Korale gave me 'Dodan-wenna' as the name of this, and Gaertner's name is 'Dodham-pana.'

3. **FLACOURTIA,** *Comm.*

Trees or shrubs with spinous branches; fl. unisexual, diœcious, in axillary clusters; sep. 4–5, slightly imbricate; pet. 0; stam. numerous; ov. surrounded by an annular or lobulate disk, 1-celled, with 3–6 parietal placentas, which often meet in centre and give the appearance of as many cells, ovules few, stigmas 3–6, recurved; fruit a few-seeded, pulpy berry.—Sp. about 12; 8 in *Fl. B. Ind.*

Small tree. Stigmas 5–6 . . . . . . 1. F. RAMONTCHI.
Shrub. Stigmas 3–4 . . . . 2. F. SEPIARIA.

1. **F. Ramontchi,*** *L'Herit, Stirp. Nov.* 59 (1784), var. **sapida,** *Roxb. Cor. Pl.* i. 49 (1795) (sp.). **Uguressa,** *S.* **Katukali,** *T.*
Thw. Enum. 17. C. P. 2583.
Fl. B. Ind. i. 193. Roxb. Cor. Pl. t. 69.

A small tree, with long, simple, spinous twigs on the young branches, and often large, compound, branched spines on the trunk, bark rather smooth, grey, young shoots pubescent; l. 2–3 in., broadly ovate, acuminate, obtuse, acute at base, more or less crenate-serrate, glabrous or pubescent on the veins beneath, thin, petioles $\frac{1}{4}$ in., often pubescent; fl. small, in little, few-flowered, axillary, racemose clusters; male fl.:—sep. reflexed, ciliate; fem. fl.:—sep. very small, ciliate, disk annular, ov. globular, stigmas 5–6, nearly sessile, recurved; berry globular, $\frac{1}{2}$ in. diam., pulpy, smooth, marked with scars of fallen stigmas; seeds 4–6, strongly lobulated.

Low country, rare (?) Kandy; Peradeniya; Nilgala and Bibile. Fl. Jan., Feb.; yellowish-white. Fruit inky-purple.

Also in Southern India.

The small dark purple fruit is edible, and hence the tree is often cultivated. About Colombo, &c. another variety with much larger and better fruit is grown, and called 'Rata Uguressa,' which is probably *F. Cataphracta*, Roxb. (*F. Jangomas*, Miq.) and introduced from Malaya. C. P. 2583 seems partly made up of this.

F. inermis, Roxb., is the Lovi-lovi, the red acid fruit of which is well known, and the tree commonly grown in native gardens; it is of Malayan origin.

2. **F. sepiaria,** *Roxb. Cor. Pl.* i. 48 (1795). **Mulanninchil,** *T.*
Thw. Enum. 17. C. P. 1650.
Fl. B. Ind. i. 194. Roxb. Cor. Pl. t. 68.

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* Ramontchi is the native name of the tree in Madagascar.

A much-branched shrub or small tree, with the branchlets ending in sharp, pointed, rigid spines; l. 1–2 in., in fascicles, cuneate-obovate or oblong, tapering to petiole, very obtuse, more or less crenate-serrate, glabrous, stiff; fl. very small, in axillary, racemose clusters shorter than the leaves; sep. acute, pilose; disk lobular; stigmas 3–4, very short, recurved; berry globular, $\frac{1}{3}$ in., smooth.

Dry country, common. Jaffna; Haragama. Fl. Feb.; greenish. Berry purplish.

Throughout India, also in Java.

4. ABERIA, *Hochst.*

Trees, without spinous branches; fl. diœcious, axillary; sep. 5–8, valvate; pet. 0; disk (in fem. fl.) annular; stam. very numerous; ov. 1-celled, with 3–7 parietal placentas; styles 3–7, spreading; fruit a juicy berry.—Sp. 5; 1 in *Fl. B. Ind.*

The rest African.

A. Gardneri, *Clos, in Ann. Sc. Nat.* 4, viii. 236 (1857). **Kétambilla,** *S.* [PLATE VII.]

Roumea hebecarpa, Gardn. l. c. 9. Thw. Enum. 18, 400. C. P. 1075. Fl. B. Ind. i. 195. Bedd. Ic. Pl. Ind. Or. t. 194.

A small, much-branched tree, 16–20 ft., bark pale grey, young shoots hairy; l. $2\frac{1}{2}$–4 in., lanceolate or oval, somewhat attenuate, acute at both ends, entire or very faintly serrate, slightly pilose above, paler and densely pubescent or tomentose beneath, lateral veins very oblique, prominent, pink, petioles $\frac{1}{3}$ in., tomentose; fl. $\frac{1}{3}$ in., on short ped., male in small umbels of 10 or more, female 1 or 2 together in the leaf-axils; sep. lanceolate, acute, tomentose; ov. densely tomentose, styles radiately spreading, stigmas fimbriate; fruit 1 in. diam., globular or somewhat depressed, velvety-pubescent.

Upper zone of moist low country and lower montane zone to 4000 ft., rather rare. About Kandy; Hangurankette; Maturata; Wilson's Bungalow. Fl. June; greenish. Fruit pale purple.

Endemic.

The fruit is edible and pleasantly acid, but the finely hairy skin is an objection.

5. TRICHADENIA, *Thwaites.*

Tree; fl. diœcious, in panicles; cal. undivided, opening irregularly; pet. 5, imbricate, each with a lanceolate scale adnate to its inner face; stam. 5; ov. 1-celled, with 3 parietal placentas, each with 1 ovule; styles 3; fruit a spherical berry;

seeds with oily endosperm, embryo with foliaceous, plicate cotyledons.—Monotypic and endemic.

T. zeylanica, *Thw. in Kew Journ. Bot.* vii. 196 (1855). **Tolol, Titta,** *S.* [PLATE VIII.]
Thw. Enum. 19. C. P. 2505.
Fl. B. Ind. i. 196. Kew Journ. Bot. vii. t. 5.

A very large tree, young shoots tomentose; l. large, 5–12 in., oblong or oval-oblong, very coarsely sinuate-serrate, obtuse or acute, rounded at base, glabrous above, tomentose on the prominent veins beneath, coriaceous, petioles $1\frac{1}{2}$–3 in., tomentose, stip. foliaceous, concave, ovate, tomentose, soon falling; fl. $\frac{1}{2}$ in., in axillary, racemose panicles from below the new leaves, 3–4 in. long, ped. and bracts tomentose; cal. tomentose; pet.-scales hairy; stam. hairy at base, anth. linear; ov. ovoid, hairy; styles short, divergent, stigma dilated, reniform; berry subglobose, $1\frac{1}{2}$ in., apiculate, 1–3-(rarely 2-) seeded; seed ovoid, $\frac{3}{4}$ in., with a bony testa.

Moist low country, extending to its upper limit; rather rare. Allagala; Hunasgiriya; Kottawa (Ferguson); Karawita Korale. Fl. May, June; pale yellow.

Endemic.

A little known forest tree, now become scarce through extensive clearing.

The leaves of seedling trees or young shoots are sometimes very large and deeply palmately 7-fid.

The wood is useless. An oil is obtained from the seeds and used in skin diseases and for burning.

6. **HYDNOCARPUS,** *Gaertn.*

Trees; fl. diœcious, fasciculate; sep. 5, imbricate; pet. 5–6, with a large scale on the inner face; male fl.:—stam. 5–8, ov. rudimentary or 0; fem. fl.:—stam. with small anth. without pollen, ov. 1-celled, with 3–5 parietal plac., ovules numerous, stigmas 3–5, sessile, dilated; fruit a berry, with tough or hard rind; seeds several, endosperm oily, cotyledons foliaceous, broad, flat.—Sp. 6; 5 in *Fl. B. Ind.*

Stam. 5.
Sep. rotundate; pet. rotundate, shorter than sep. . . 1. H. VENENATA.
Sep. ovate; pet. lanceolate, longer than sep. . . . 2. H. ALPINA.
Stam. 8 . . . . 3. H. OCTANDRA.

1. **H. venenata,** *Gaertn. Fruct.* i. 288 (1788). **Makulu,** *S.* **Makal,** *T.*
Herm. Mus. 50. *H. inebrians*, Vahl, Symb. Bot. iii. 100; Thw. Enum. 18. Moon Cat. 74. C. P. 1630.
Fl. B. Ind. i. 196. Gaertn. Fruct. i. t. 60, f. 3 (fruit only).

A tree, bark smooth, whitish, young shoots pubescent; l. 4–6 in., narrowly or broadly lanceolate, narrowed at base, attenuate to subacute apex, shallowly serrate, glabrous above, pubescent on veins beneath, thick, veins very oblique, petioles $\frac{1}{4}$–$\frac{1}{2}$ in., pubescent, stip. minute, soon falling; fl. $\frac{3}{8}$ in., male in small, short, crowded, shortly-peduncled, axillary panicles, female solitary or 2 together, axillary, all densely pubescent; sep. rotundate, 2 larger; pet. rotundate, rather shorter than sep., strongly ciliate, pet.-scales ovate, acuminate, very hairy, golden brown; stam. 5; ov. globular, shaggy, with golden-brown hair, stigmas deeply bifid, flat, spreading, bright green; fruit nearly globular, with a short, blunt beak, $\frac{3}{4}$–1 in. diam., densely covered with thick, ferrugineous tomentum; seeds about 6, closely packed, angular.

Low country up to about 2000 ft., on banks of rivers; rather common. Ratnapura: Kurunegala; Hantane; Peradeniya; Colombo (Jonville, 1796, Mus. Brit.); Tambalagam Pattu, E. Prov.

Fl. March, April; brownish-white. Endemic.

The fruits are used as a fish-poison, having narcotic properties; and it is said that these are sometimes communicated to the fish so killed. The oil from the seeds is employed in skin complaints.

Wood yellow, moderately hard.

2. **H. alpina,** *Wight, Ic.* iii. 3, 2 (1845). **Gomma,** *S.* **Attuchankulai,** *T.*

Thw. Enum. 19. C. P. 2918.

Fl. B. Ind. i. 197. Wight, Ic. t. 942. Bedd. Fl. Sylv. t. 77.

A large tree, young shoots nearly glabrous; l. $3\frac{1}{2}$–6 in., lanceolate or oblong-oval, attenuate, narrowed at base and often unequal, entire, glabrous; fl. nearly 1 in., axillary, male in crowded, paniculate fascicles, fem. solitary or 2 together, ped. $\frac{3}{4}$ in., pubescent; sep. ovate, acute or obtuse; pet. lanceolate, longer than sep., margins revolute, pet.-scales strap-shaped, pubescent; stam. 5, shorter than pet.; ov. densely pubescent, stigmas flat, spreading or recurved; fruit nearly globose, pointed, tipped with persistent stigmas, 1–$1\frac{1}{4}$ in., densely and finely tomentose; seeds numerous, closely packed.

Low country, chiefly in the dry districts. Bintenne; Batticaloa; Karawita Kande.

Fl. April; yellowish-white.

Occurs also in the Nilgiri Hills, up to nearly 6000 ft.

The name is unfortunately chosen; even in the Nilgiris there is no *alpine* country, and in Ceylon this tree shows no tendency to ascend into the montane region at all.

3. **H. octandra,** *Thw. in Kew Journ. Bot.* vii. 197 (1855).

Thw. Enum. 19. C. P. 2640.

Fl. B. Ind. i. 197.

A tree, 40–50 ft., bark brown, young shoots scurfy-pubescent; l. 2–4 in., oval, acute and usually unequal at base, shortly caudate, obtuse, entire, thick, glabrous above, sparingly stellate-hairy and glandular (especially when young) beneath, petioles $\frac{1}{2}$ in., sulcate, stip. minute, deciduous; fl. nearly $\frac{3}{4}$ in., 2–8 in axillary fascicles, ped. $\frac{1}{4}$–$\frac{5}{8}$ in.; sep. unequal, broadly oblong, obtuse; pet. rotundate, shorter than sep., strongly ciliate, pet.-scales $\frac{1}{2}$ length of pet., rotundate, apiculate, fringed; stam. 8, rather shorter than pet., fil. hairy; ov. tomentose, placentas 4, stigmas 4, very large, flat; fruit spherical, large, $1\frac{1}{2}$–$2\frac{1}{2}$ in., pericarp thick, hard, covered with a fine, rusty-brown tomentum; seeds 4–12 or more, immersed in pulp, oblong-ovoid.

Moist low country; very rare. Ambagamuwa district at about 2500 ft.; Mandagalla; Pasdun Korale. Fl. March; greenish-white.

Endemic.

XII.—PITTOSPORACEÆ.

TREES or shrubs; l. simple, alternate, without stip.; fl. regular, bisexual; sep. 5, imbricate; pet. 5, imbricate, slightly connate at base; stam. 5, distinct; ov. with 2 parietal placentas often meeting in the middle and so falsely 2-celled, ovules few or numerous; fruit a tardily 2-valved capsule; seeds few, with a small embryo in copious endosperm.

PITTOSPORUM, *Banks.*

For characters, see *Order.*—Sp. about 50; 9 in *Fl. B. Ind.*

Fls. in simple, sessile umbels . . . . . 1. P. TETRASPERMUM.
Fls. in long-stalked, racemose corymbs . . 2. P. ZEYLANICUM.

1. **P. tetraspermum,** *W. and A. Prod.* p. 154 (1834).
Thw. Enum. 68. C. P. 572, 3994 (?).
Fl. B. Ind. i. 198. Wight, Ic. 971.

A small tree or shrub, young shoots glabrous; l. $1\frac{1}{2}$–3 in., sub-verticillate, crowded, lanceolate or oval, tapering to base, subacute, entire or nearly so, glabrous, thick, reticulate venation conspicuous beneath, petioles $\frac{1}{4}$ in. or less; fl. few, in small, terminal, nearly sessile umbels, ped. $\frac{1}{4}$–$\frac{3}{8}$ in., slightly pubescent; sep. narrow-lanceolate, acuminate, pet. nearly $\frac{1}{2}$ in., erect, strap-shaped; capsule globose, $\frac{3}{8}$ in., apiculate, valves flat; seeds 4.

Upper montane zone on banks of streams; rather common. Fl. Feb.; greenish yellow.

Also in the Nilgiri Mountains.

C. P. 3994 is referred by me (Cat. Ceyl. Pl. 6) doubtfully to *P. neelghenense*, W. and A., figured at Wight, Ill. i. t. 70. The specimens are in flower only, so that the seeds cannot be examined. The flowers are in racemes, not umbels, larger, with ovate sep. and longer glabrous ped., and the leaves narrower and more oblong. I have gathered the same plant with very revolute leaves on the Elk Plains, also without fruit. It may be W. and A.'s species, but can scarcely be distinct specifically from *P. tetraspermum.*

2. **P. zeylanicum,** *Wight, Ill.* i. 173 (1838). **Kétiya,** *S.*
Thw. Enum. 68. C. P. 476.
Fl. B. Ind. i. 199.

A small tree, 15–20 ft., bark smooth, whitish, young shoots glabrous or slightly pubescent; l. 3–5 in., crowded at ends of branches, lanceolate- or obovate-oblong, much tapering at base, obtuse or rounded at apex, entire, often rather undulate, glabrous, ped. $\frac{1}{2}$–$\frac{3}{4}$ in.; fl. numerous, in long-stalked, racemose or paniculate corymbs at end of branches, equalling or exceeding l., ped. smooth; sep. oval, subacute, glabrous; pet. nearly $\frac{1}{2}$ in., linear, erect, spreading at ends; stam. shorter than pet.; ov. glabrous or nearly so, ovules 8, style long; capsule subglobose, somewhat depressed, $\frac{1}{2}$–$\frac{3}{4}$ in., tipped with style, slightly rough, yellow, valves very thick, resinous, hard; seeds about 8, angular, closely packed, unequal, erect from basal placentas, testa pulpy, orange-red.

Moist low country, and extending in the montane zone up to 6000 ft.; rather common. Sabaragamuwa (Moon); Deltota; Atampitiya; Badulla, Galagama and elsewhere in Uva; Hakgala; Summit of Ritigala, N.C. Prov. Fl. April; yellowish-white, sweet-scented.

Endemic.

I do not find that this turns black in drying as stated in Fl. B. Ind. (following Wight).

XIII.—POLYGALACEÆ.

HERBS rarely shrubs, or trees; l. simple, alternate, entire, without stip.; fl. irregular, bisexual; sep. 5, more or less unequal, imbricate; pet. 3 or 5, distinct or somewhat connate, free or united at base with stam.; stam. 8 or 4–5, distinct or monadelphous, anth. opening by terminal pores; ov. 1- or 2-celled, with 1 or few ovules in each cell; fruit a 2-celled, 2-seeded capsule, or 1-seeded and indehiscent; seeds with or without endosperm.

Herbs (rarely shrubs). Fruit 2-celled, 2-seeded.
Sep. very unequal. Stam. 8 . . . . . 1. POLYGALA.
Sep. nearly equal. Stam. 4–5 . . . . . 2. SALOMONIA.
Trees. Fruit 1-celled, 1-seeded . . . . . 3. ZANTHOPHYLLUM.

Of the species of *Polygala* only four occur in the montane zone, one, *P. arillata*, being confined to it. *Salomonia* and *Zanthophyllum* inhabit the moist low region.

1. POLYGALA, *L.*

Herbs, rarely shrubs; fl. racemose; sep. 5, 2 inner much larger (wings); pet. 3, adnate at base to monadelphous stamens, lower one keeled and crested at end; stam. 8, filaments connate for lower half, forming a split sheath, anth. opening by pores; ov. 2-celled, with a single ovule in each; fruit a more or less compressed capsule, 2-celled, 2-seeded; seed with endosperm, usually with an aril or caruncle.—Sp. about 250; 16 in *Fl. B. Ind.*

An erect shrub . . . . 1. P. ARILLATA.
Herbs, sometimes with a woody base.
Wing-sep. membranous.
Racemes lateral, hairy . . . . . 2. P. JAVANA.
Racemes terminal, glabrous . . . 3. P. LEPTALEA.
Wing-sep. herbaceous.
Leaves thin.
Capsule ciliate.
Wings longer than capsule.
Lves. acute . . . . . . 4. P. GLAUCOIDES.
Lves. obtuse . . . . . . 5. P. CHINENSIS.
Wings as long as capsule . . . . 6. P. ROSMARINIFOLIA.
Capsule with a thick wing . . . . 7. P. SIBIRICA, var.
Leaves thick . . . . 8. P. TELEPHIOIDES.

1. **P. arillata,** *Ham. in Don Prodr.* 199 (1825).
Thw. Enum. 22. C. P. 434.
Fl. B. Ind. i. 200. Wight, Ic. t. 946.

A slender shrub or small tree, 8–12 ft., bark smooth, yellowish-grey, young parts pubescent; l. 3–5 in., lanceolate or obovate-lanceolate, acute at both ends, entire, glabrous above, slightly pubescent and with prominent veins beneath, thin, petioles $\frac{1}{4}$ in.; fl. large, $\frac{1}{2}$ in., in lax, drooping, long-stalked, terminal or extra-axillary racemes, ped. $\frac{1}{4}$ in., pubescent, bracts linear, very early caducous; sep. very unequal, soon falling, wings very large, petaloid, oblong-ovate; pet. erect, large, equal, connate for half their length, soon falling; capsule didymous, rotundate, nearly $\frac{1}{2}$ in., somewhat compressed, longitudinally wrinkled when dry; seeds large, $\frac{1}{5}$ in.,

globular, smooth, nearly covered with a fleshy aril, yellowish, the top black, shining.

Montane zone, from 7000 down to 4000 ft.; rather common. Pedumtalagala; Elk Plains; Hunasgiriya; near Badulla. Fl. July–November; golden-yellow.

Occurs in the mountains of India, Malaya, and S. China.

A graceful little tree, with much the habit of a Leguminosa.

2. **P. javana,** *DC. Prod.* i. 327 (1824). **Tilo-guru,** *S.*
Thw. Enum. 22. C. P. 184.
Fl. B. Ind. i. 201.

Semi-shrubby, 1–3 ft. high, with long, divaricate, wiry, pubescent branches; l. numerous, crowded, ½–1 in., sessile or nearly so, obovate-oblong, obtuse, apiculate, pubescent above, finely stellate-hairy beneath; fl. in extra-axillary, hairy racemes, ½–3 in. long, ped. very slender, hairy, bracts 3 together, small, ovate, acuminate, persistent; sep. hairy, wings membranous, triangular-ovate, much veined; capsule much flattened, ciliate on edge, keeled, shorter than the wings; seeds hairy.

Low country, principally in the dry districts; rather common. Karativu, W. Coast; Vavuniya Vilankulam; Mannar; Jaffna; Balangoda; Maturata; Galagama; Bibile. Fl. all the year; yellow, the crest purple.

Also in Peninsular India and in Java.

3. **P. leptalea,** *DC. Prod.* i. 325 (1824).
Thw. Enum. 22. C. P. 3550.
Fl. B. Ind. i. 202.

Perennial, rootstock woody, sending up numerous, erect, very stiff, slightly branched, angular, glabrous stems; l. very few, erect, sessile, linear, 1–1¼ in., acuminate, glabrous; fl. small, drooping, secund, in an erect, terminal, lax, spicate raceme 3 or 4 in. long, ped. very short, readily disarticulating, slender, curved, bracts long, setaceous, very soon falling; wings membranous, oval-oblong; capsule small, much flattened, rotundate, transparent, much shorter than wings.

Dry low country, amongst long grass; very rare. Confined to the grassy country in the north part of Uva and adjacent part of Central Province. Medamahanuwara; about Nilgalla abundant. Fl. Jan.–March; pink, the crest darker.

Also in Northern India, the Nilgiris, and Burma, and in tropical Australia.

4. **P. glaucoides,** *L. Sp. Pl.* 705 (1753).
Fl. Zeyl. n. 270. Moon Cat. 51. *P. arvensis*, Willd., var. *a.* Thw. Enum. 400. C. P. 715.
Fl. B. Ind. i. 203.

A small, perennial herb, with numerous, wiry, slightly branched, pubescent, prostrate stems spreading from a centre; l. numerous, ½ in., nearly sessile, lanceolate-oblong, mucronate, glabrous; fl. small, few, in short racemes scarcely exceeding the l.; outer sep. oval, acute, wings ovate, very acute, slightly exceeding the glabrous or ciliate capsule.

Var. β. **triflora.**

Fl. Zeyl. n. 269. *P. triflora*, L. Sp. Pl. 705. *P. arvensis*, Willd., var. β. Thw. Enum. 400. C. P. 1083.

Branches more erect; l. longer, linear, more strongly mucronate; fl. rather larger.

Var. γ. **hirsutula**.

P. hirsutula, Arn. Pug. 4. *P. elongata*, Klein, var. β., Thw. Enum. 22. C. P. 1081.

Often woody below, branches very numerous, prostrate; l. oval or lanceolate, usually pubescent on both sides; fl. larger, ⅖ in., in long-stalked, divaricate, 1–4-flowered racemes usually much exceeding the l.; capsule ⅙ in. wide, finely ciliate; seed black, sparingly hairy, aril divided to the base into 4 narrow lobes nearly as long as the seed.

Grassy open places; common. Vars. α. and β. in the low country, var. γ. on the montane patanas 4–7000 ft. Fl. all the year; white. Var. γ. often pale violet, crest purple.

Endemic (?).

Linnæus' *triflora* is placed under *P. chinensis* in Fl. B. Ind. I follow that work in placing *P. hirsutula* as a variety here, but should prefer to consider it as a distinct species.

[*P. elongata*, Klein, given for 'Ceylon, Walker' in Fl. B. Ind. i. 204, must be considered very doubtful. There is a strong suspicion that the specimens (in Herb. Kew) came from the Himalaya.]

5. **P. chinensis,** *L. Sp. Pl.* 704 (1753).
P. arvensis var *c.*, Thw. Enum. 400. C. P. 3674.
Fl. B. Ind. i. 204.

Annual or perennial (?), with many short, prostrate stems with long, scattered hairs; l. small, ⅙–¾ in., nearly sessile, obovate-oblong or obovate, obtuse, apiculate, with a few long hairs beneath and on margin; fl. small, in slender racemes, 1 in. long; outer sep. lanceolate, acuminate, wings oval, oblique, cuspidate, longer than the broadly oblong, notched, ciliate capsule.

Low country, in sandy places; common (?). Colombo (Ferguson); Trincomalie (Glenie).

Throughout tropical Asia and Australia.

This is not readily to be distinguished from the last, and is connected with it by intermediates. I have not noted its distribution.

6. **P. rosmarinifolia,** *W. and A. Prod.* 37 (1834).
Thw. Enum. 22, 400 (var. *puberula*). C. P. 1082.
Fl. B. Ind. i. 204.

An erect annual, stems 12–18 in., with ascending, appressed-pubescent branches; l. numerous, sessile, erect, linear, apiculate, glabrous or slightly hairy; fl. few, erect, in erect racemes usually shorter than the l.; outer sep. oblong, acute, ciliate, wings oblong, oblique, mucronate, membranous at margin, about as long as oblong-ovoid, notched, pubescent, ciliate capsule.

Upper zone of low country and lower montane zone to about 4000 ft.; rather rare. Palagalla; Kandy; 'common in the Uva district' (Thwaites); Atampitiya; Lunugala; Wilson's Bungalow; Mannar. Fl. all the year; reddish-pink.

Also in Southern India.

7. **P. sibirica,** *L. Sp. Pl.* p. 702 (1753), var. **macrolophos,** *Hassk. in Miq. Ann. Mus.* i. 167 (sp.).
P. glomerata, Lour., var. *pedunculosa*, Thw. Enum. 400. C. P. 592.
Fl. B. Ind. i. 205.

A semi-shrubby herb, with many long, ascending, finely hairy branches; l. extremely variable, $\frac{1}{2}$–$2\frac{1}{2}$ in., from broadly oval to narrowly linear-lanceolate, acute at both ends or acuminate at apex, glabrous but for a few long hairs beneath, midrib prominent; fl. rather large, $\frac{1}{4}$ in., on rather long, slender ped., in few-fld. axillary or extra-axillary racemes shorter than or about as long as the l., bracts caducous or persistent; outer sep. oval, ciliate, acuminate, wings oval, acute; capsule shorter than sep., orbicular, notched, surrounded by a thick, narrow wing; seeds hairy, aril large, with 3 linear lobes.

Moist country, ascending into the montane region. Labugama; Ambagamuwa; Maturata; Adam's Peak; Dolosbagie. Fl. Jan.–March; white, the crest violet.

The type is found throughout India, Central Asia, China, and Japan. Our variety (perhaps a distinct species) is endemic.

8. **P. telephioides,** *Willd. Sp. Pl.* iii. 876 (1800).
Thw. Enum. 22. C. P. 1080.
Fl. B. Ind. i. 205.

A perennial herb, with numerous, short, thick, prostrate or ascending, pilose branches from a woody rootstock; l. numerous, crowded, about $\frac{1}{2}$ in., sessile, oblong-oval, acute, thick, glabrous; fl. very small, crowded in short, racemose, extra-axillary fascicles; outer sep. acute, wings oval, oblique, strongly acuminate; capsule broadly ovoid, notched, glabrous, not winged.

Low country, principally in the dry districts. Colombo (Gardner); Haragama; Nilgalla; Mannar. Fl. Jan.–April; bright blue and yellow. Also in Southern India, the Malay Islands, China, and the Philippines.

2. SALOMONIA,* *Lour.*

Annuals; fl. in terminal spikes; sep. 5, nearly equal; pet. 3, united at base to stam.-tube, lower not crested; stam. 4 or 5, fil. monadelphous for lower half, anth. opening by pores; ov. 2-celled, each cell with 1 pendulous ovule; capsule 2-celled, didymous, flattened, 2-seeded; seeds without an aril, with endosperm.—Sp. 8; 5 in *Fl. B. Ind.*

Leaves not ciliate . . . . 1. S. OBLONGIFOLIA.
Leaves strongly ciliate . . . . . . 2. S. CORDATA.

1. **S. oblongifolia**, *DC. Prod.* i. 354 (1824).
Fl. Zeyl. n. 268. *Polygala ciliata*, L. Sp. Pl. 705. Arn. Pug. 4. Thw. Enum. 22. C. P. 1086.
Fl. B. Ind. i. 207. Wight, Ill. t. 22 B. (*S. obovata*).

A slender, erect annual, stem 6–12 or more in., striate, glabrous, often slightly winged, with few ascending branches in the upper part; l. sessile, oval-lanceolate-oblong or linear, acute or acuminate, rounded at base, entire, glabrous; fl. very small, sessile, in a rather lax, erect, filiform spike, 2–3 in. long, bracts acuminate; capsule twice as broad as long, glabrous, with a marginal crest of rigid, spinous cilia.

Wet places in the moist low country; rather common. Kalutara (MacRae); Reigam Korale; Pasdun Korale; Kalawane, S. Prov.; Hiniduma. Fl. March, September; purplish-white.

Also in many parts of India and Malaya to tropical Australia.

There is a specimen in Hb. Banks (Brit. Mus.) labelled 'Wil-mudu-magane Cingalensibus' from Van Royen, probably collected by Hermann.

The original *Polygala ciliata* of Linnæus (Herb. Hermann) I refer to this (also noted in Thw. Enum. by Ferguson), but Bennett (in Fl. B. Ind.) thinks the specimens identical with *S. cordata*. Linn.'s name referred to the capsule, not the leaves, as is shown by his excellent description in Fl. Zeyl. (see Journ. Linn. Soc. xxiv. 146).

The figure of Wight quoted above is of a starved form; Ceylon plants are usually very much taller and more slender.

2. **S. cordata,** *Arn. Pug.* 4 (1836).
S ciliata, DC. Prod. i. 354. Thw. Enum. 22. C. P. 2906.
Fl. B. Ind. i. 206 (*S. ciliata*, DC.). Wight, Ill. t. 22 C.

An erect annual, differing from *S. oblongifolia* only in the following points:—stem stouter, more evidently winged; l. broader, ovate or ovate-oblong, subcordate at base, strongly

* Commemorates King Solomon, the earliest of known botanists.

ciliate; spikes very crowded; spinous cilia on margin of capsule longer and more filiform.

Wet or swampy ground in the moist low country; rather rare. Colombo; Pasdun Korale. Fl. August, December.

Endemic.

S ciliata, DC., is the earliest name; but as this is is not Linnæus' *P. ciliata*, as was supposed, it is perhaps better to abandon it in favour of Arnott's later one.

3. XANTHOPHYLLUM, *Roxb.*

Trees; fl. in racemes; sep. 5, rather unequal; pet. 5, free, the lowermost keeled; stam. 8, distinct; ov. 1-celled, with 2 parietal placentas, ovules 4; fruit indehiscent, 1-seeded; seed globular, without endosperm or aril.—Sp. 15; 10 in *Fl. B. Ind.*

X. flavescens, *Roxb. Cor. Pl.* iii. 82 (1819). **Palala,** *S.*

Fl. Zeyl. n. 407 (*Bannisterioides*). Wight, Ill. i. 50. Thw. Enum. 23, and *X. virens*, Roxb. 400. C. P. 1244.

Fl. B. Ind. i. 209. Roxb. Cor. Pl. iii. t. 284 (*X. virens*).

A tree, young parts smooth; l. $2\frac{1}{2}$–7 in., oblong-ovate, acute at base, acuminate, entire, smooth and shining above, pale and reticulate beneath, thick, yellow when dry; fl. $\frac{3}{4}$ in., in short, extra-axillary racemes, together forming a large panicle at end of branch, ped. short, pubescent; sep. rounded, obtuse, pubescent; pet. oblong; fil. hairy; ov. hairy, surrounded by a disk, style conical; fr. globular, $\frac{5}{8}$ in., glabrous, olive-green with a glaucous bloom.

Moist low country; rather rare. Kalutara; Pasdun Korale; Ratnapura; Colombo.

Fl. March; pinkish-white.

Also in S.W. India, E. Bengal, Burma, Sumatra, and Java.

The Ceylon plant is *X. virens*, Roxb., which is reduced to a variety of *X. flavescens* in Fl. B. Ind. The leaves frequently present large circular pores scattered over the under surface.

XIV.—CARYOPHYLLACEÆ.

Herbs; l. simple, opposite, with or without stip.; fl. regular, bisexual; sep. 5, distinct, persistent; pet. 5, distinct; stam. 2–5 or 10, distinct; ov. 1-celled, with ovules on a free central or basal placenta, styles 3 or 5, distinct or more or less con-

nate; fruit a 1-celled capsule, 3-valved or opening by teeth at top; seed with embryo usually curved round the mealy endosperm.

Leaves without stipules. Styles distinct (*Alsineæ*).
  Styles 5. Capsule cylindrical, opening by 10 teeth . 1. CERASTIUM.
  Styles 3. Capsule ovoid, opening by 3 teeth . . 2. STELLARIA.
Leaves with scarious stipules. Styles more or less combined (*Polycarpeæ*).
  Pet. bifid . . . . 3. DRYMARIA.
  Pet. entire or nearly so.
    Sep. keeled on the back . . . . . . 4. POLYCARPON.
    Sep. all scarious . . . . 5. POLYCARPÆA.

A very large extra-tropical and alpine family, scarcely (the tribe *Sileneæ* not at all) represented here. *Cerastium* and *Stellaria* are montane, and *Drymaria* extends into the lower montane zone; the other two genera are in the low country.

1. CERASTIUM, *L.*

Herbs; fl. in dichotomous cymes; sep. 5, distinct; pet. 5, distinct, bifid; no disk; stam. 10; ov. 1-celled, with numerous ovules on a central placenta, styles 5; capsule cylindrical, membranous, splitting at top into 10 short teeth; seeds numerous.—Sp. about 40; 5 in *Fl. B. Ind.*

Capsule scarcely longer than cal., teeth recurved . 1. C. INDICUM.
Capsule twice as long as cal., teeth straight . . 2. C. VULGATUM.

1. **C. indicum,** *W. and A. Prod.* 43 (1834).
Thw. Enum. 24. C. P. 2957.
Fl. B. Ind. i. 227. Wight, Ill. i. t. 26.

A perennial herb, with very weak, straggling, slender, brittle, flaccid, hairy stems, 1–2 ft. or more; l. 1–2 in., nearly sessile, linear-lanceolate, acute at both ends, hairy on both sides, ciliate, thin; fl. few, small, in terminal, dichotomous cymes, ped. densely glandular-hairy; sep. linear-lanceolate, acute, glandular-hairy, with membranous margins; pet. $\frac{1}{4}$ in., longer than sep., linear-oblong or spathulate, bifid; ov. ovoid-oblong, styles 5; capsule a little longer than persistent sep., membranous, opening at summit by 10 recurved teeth; seeds several, dark brown, muriculate.

Upper montane zone; common. Fl. Aug., Sept.; white.
Also in the mountains of Southern India.
I find the styles always 5, not 3 as given in Fl. B. Ind.

* 2. **C. vulgatum,** *L. Fl. Suec. ed.* 2, 158 (1755), var. **glomeratum,** *Thuill. Fl. Par.* (1790) (sp.).
Trim. in Journ. Bot. xxiii. 142.
Fl. B. Ind. i. 228. Wight, Ic. t. 948.

A much-branched, erect annual or perennial herb, branches ascending, densely pubescent; l. nearly sessile, oval-oblong or oblong-lanceolate, obtuse or acute, hairy on both sides; fl. numerous, the cymes at first capitate, afterwards open and spreading, ped. hairy, bracts with membranous margins; sep. acute or subacute, hairy, with membranous margins; pet. slightly longer, bifid; capsule twice as long as persistent sep., slightly curved, opening by 10 short, straight teeth; seeds very small, rough, brown.

Upper montane zone; a common weed about Nuwara Eliya, &c., but perhaps introduced with grass-seed. Fl. all the year; white.

Throughout Europe and temperate Asia; very common in Britain, also in the Nilgiris.

This is not given in Thw. Enum. as a native, though mentioned in the Preface as an introduced plant.

2. STELLARIA, *L.*

Herbs; fl. in cymes; sep. 5, distinct; pet. 5, distinct, bifid; stam. 10; ov. 1-celled, with few ovules on a central basal placenta, styles 3; capsule ovoid, 3-toothed or valved; seeds few.—Sp. about 70; 20 in *Fl. B. Ind.*

S. drymarioides, *Thw. Enum. Pl. Zeyl.* 24 (1858).
C. P. 400.
Fl. B. Ind. i. 229.

An herb with procumbent, quadrangular, glabrous stems, rooting at the nodes and giving off erect flaccid branches pilose when young; l. $\frac{3}{4}$–$1\frac{1}{4}$ in., rotundate-oval, acute at base and tapering into pubescent petiole, slightly pilose, thin, with a conspicuous intra-marginal vein; fl. $\frac{1}{4}$–$\frac{3}{8}$ in., nodding, in small, terminal, paniculate cymes, ped. glandular-pubescent; sep. ovate, subacute, glandular-pubescent, with membranous margins; pet. wedge-shaped, half as long as sep., deeply bifid; ov. subglobose, ovules 3 or 4, styles 3, filiform; capsule (not seen) '1-seeded.'

Lower montane zone; very rare. Only found as yet near the Haputale Pass at about 4000 ft. Fl. April; white.

Endemic; unless a plant from Mauritius be the same (see Baker, Fl. Maur. p. 14).

S. media, With., the common Chickweed of Europe, is a frequent weed in the higher hill districts, but I think certainly introduced. It is C. P. 3090, and is figured in Wight, Ic. t. 947 from Nilgiri specimens.

Two other introduced European weeds of cultivated ground are met with in the mountains; *Sagina procumbens*, L., rather rarely, and *Spergula arvensis*, L., the Spurrey (C. P. 564) commonly.

3. DRYMARIA, *Willd.*

Herbs; fl. in dichotomous cymes; sep. 5, distinct, herbaceous; pet. 5, distinct, bifid; stam. 2–5; style 3-fid.; capsule 3-valved.—Sp. 16; 1 in *Fl. B. Ind.*

D. cordata, *Willd. in R. and S. Syst.* v. 406 (1819). **Kukulupala,** S. (Moon).
Alsine nervosum, Moon Cat. 23. Thw. Enum. 25. C. P. 1091. Fl. B. Ind. i. 244.

An erect annual, 1–2 ft., with many erect, very slender, glabrous, dichotomous branches; l. rotundate-oval, subcordate at base, acute, tapering into petiole, glabrous, 3–5-veined from base, petiole $\frac{1}{8}$–$\frac{1}{4}$ in., stip. of several setaceous bristles; fl. very small, $\frac{1}{6}$ in., in long-stalked, lax, dichotomous, terminal and axillary cymes, ped. very slender, glandular-pilose, deflexed after flowering, bracts membranous; sep. oblong, obtuse, prominently 3-nerved, with membranous margins; pet. about as long as sep., deeply bifid; stam. usually 2; style short, 3-fid.; capsule shorter than cal., globose, 3-valved, 1-seeded; seed reniform, slightly compressed, muriculate, dark brown.

Open waste ground in the moist region, 1000 to 4000 ft.; common. Matale; Maskeliya; Rambodde: Peradeniya. Often a weed in gardens. Fl. Jan. to May.

Found in hilly country throughout the tropics of Asia, Africa, and America.

Strangely described as a 'shrub' in Fl. B. Ind. Our plant has usually only 2 stamens, and is probably *D. diandra*, Bl.

4. POLYCARPON, *L.*

Herbs; fl. in dichotomous cymes; sep. 5, distinct, keeled on the back; pet. 5, distinct, not bifid; stam. 3–5; style 3-fid; capsule 3-valved; seeds numerous, narrowly ovoid, embryo nearly straight.—Sp. 6; 1 in *Fl. B. Ind.*

P. Lœflingiæ, *B. and Hk. f. Gen. Pl.* i. 153 (1862).
Harpalosia Lœflingiæ, Wall., Thw. Enum. 25. C. P. 1090. Fl. B. Ind. i. 245 (not given for Ceylon).

A perennial herb, with very numerous, diffuse, wiry, pubescent, prostrate or ascending branches, 4–10 in. long, spreading from a centre; l. numerous, sessile, linear or linear-spathulate, subacute, pubescent or glabrous, stip. scarious, white; fl. small, in numerous, small, more or less dense, dichotomous cymes, bracts scarious; sep. somewhat unequal, linear, acute, thick and keeled on the back, with white, scarious margins; pet. small, shorter than sep., linear, truncate; cap-

sule very thin, enclosed in the sep.; seeds numerous, rough, pale brown.

Dry low country; rather rare. Haragama; Kantalai. Fl. all the year.

Occurs throughout tropical Africa and Asia.

Short leafy branches in the axils give the appearance of whorled leaves.

5. POLYCARPÆA, *Lam.*

Erect herbs; fl. in cymes; sep. 5, scarious; pet. 5, entire; stam. 5; ov. 1-celled, with a free basal placenta, style short, stigmas 3; capsule 3-valved, with 3 or 4 perfect and numerous abortive seeds.—Sp. 24; 3 in *Fl. B. Ind.*

P. corymbosa, *Lam. Ill.* ii. 129 (1793).

Herm. Mus. 66. Burm. Thes. 184. Fl. Zeyl. n. 100. *Achyranthes corymbosa*, L. Sp. Pl. 305. Thw. Enum. 25. C. P. 2383.

Fl. B. Ind. i. 245. Wight, Ic. t. 712. Burm. Thes. t. 65, f. 2.

An erect, annual herb, occasionally somewhat woody below, 6–18 in., slightly branched, glabrous below, pubescent above; l. $\frac{1}{3}$–$\frac{1}{2}$ in., narrowly linear, sessile, mucronate, glabrous, stip. linear-lanceolate, acute, scarious; fl. numerous, small, crowded in many-stalked, dense, much-branched cymes, forming large, flat-topped heads, bracts scarious, silvery, bristle-pointed; sep. linear-lanceolate, not keeled, very acute, scarious, silvery, veined with red; pet. very small, much shorter than sep.; style 3-lobed; capsule very small, much shorter than sep., shining, brown.

Low country, especially in the dry districts, in sandy and rocky ground; common. Fl. all the year; pinkish.

Ranges widely throughout the tropics of the world.

Hermann gives 'Kiri-henda' as the Sinhalese name, which is more usually applied to the somewhat similar *Celosia argentea.*

Very variable in appearance, often dwarf and prostrate. The leaves appear to be whorled owing to the presence of leaf fascicles (short leafy branches) in their axils.

XV.—PORTULACACEÆ.

HERBS or under-shrubs; l. alt. or opp. with or without stip.; fl. regular, bisexual, sessile, terminal; sep. 2, connate below, free part imbricate, deciduous; pet. 4 or 5, distinct, *perigynous*, fugacious; stam. 4–16, *perigynous*, distinct; ov. adherent to base of sp., and *half-inferior*, 1-celled, ovules numerous on

basal placenta; capsule dehiscent transversely by a deciduous lid; seeds reniform, numerous, embryo curved round mealy endosperm.

Of our 5 species 2 are common weeds of cultivated land, 2 seashore plants, and 1 a rock plant in the dry region.

PORTULACA, *L.*

(For characters, see *Order*).—Sp. 16; 5 in *Fl. B. Ind.*

Leaves flat or nearly so.	
Fl. in clusters	1. P. OLERACEA.
Fl. solitary.	
Nodes with large white stipular scales . .	2. P. WIGHTIANA.
Nodes with a ring of hairs.	
Leaves opposite	3. P. QUADRIFIDA.
Leaves alternate	4. P. TUBEROSA.
Leaves terete or nearly so	5. P. SUFFRUTICOSA.

1. **P. oleracea,** *L. Sp. Pl.* 445 (1753). **Genda-kola,** *S.* **Pulik-kiṙai, Pulichchánkiṙai,** *T.*
Moon Cat. 37. Thw. Enum. 23. C. P. 1103.
Fl. B. Ind. i. 246.

A stout, glabrous annual, with numerous prostrate or ascending branches; l. alternate, $\frac{3}{8}$–$\frac{3}{4}$ in., crowded beneath the branches, oblong-spathulate, very obtuse, thick, pale and glistening beneath, petiole very short, no stipular appendages; fl. sessile, few together, in terminal heads, inconspicuous; sep. fleshy, very acute, persistent, pet. 4–5, about as long as sep., very delicate and soon falling, or 0; stam. 8–12; capsule dehiscent transversely, enclosed in sep., the free portions of which also separate by a transverse division and come away with the lid; seeds numerous, muriculate, dark brown.

An abundant weed in cultivated ground throughout the country. Fl. all the year; yellow.

In all tropical and warm countries. The Purslane, a common pot-herb.

The fls. are open only for a few hours in the morning.

2. **P. Wightiana,** *Wall. Cat.* No. 6845 (1828).
Fl. B. Ind. i. 247.

A small, woody, prostrate, rooting, much-branched perennial, the nodes very close, glabrous; l. alternate, sessile, crowded, imbricate, oval, acute, very fleshy, easily detached, stipular appendages persistent, scales as long as the l. and nearly hiding them, lanceolate, acuminate, shining and silvery; fl. solitary, terminal, sessile, with an involucre of 4 fleshy leaves; pet. 4, ovate, acute, spreading; stam. 4.

Dry region by the coast; very rare. Abundant on dried mud flats near Illupaikaduvai, Mannar Dist., 1890. Fl. Feb.; bright yellow.

Also in the Carnatic, S. India.

First found by Koenig, whose specimens (in Brit. Mus.) are labelled 'Zeylona, ad littora maris præcipue prope Ramanad' (which may rather be in India).

A very remarkable little plant, closely covered with dead white glistening leafy scales, which persist after the leaves have fallen.

3. **P. quadrifida,** *L. Mont.* 73 (1767). **Hin-genda-kola,** *S.*
Moon Cat. 37. Thw. Enum. 23. C. P. 1100.
Fl. B. Ind. i. 247. Wight, Ill. ii. t. 109.

A prostrate, much-branched annual, creeping and rooting at the nodes, with numerous, slender, glabrous stems; l. numerous, opposite, $\frac{1}{4}$ in., very nearly sessile, oval, sub-obtuse, very fleshy (lenticular on section), stipular appendages a ring of long white hairs; fl. solitary, terminal, sessile, surrounded with long white hairs and an involucre of 4 leaves; sep. oblong-oval, obtuse, thin; pet. 4, oval, obtuse; stam. 8; style filiform, 4-fid at apex; capsule acute; seeds twice the size of *P. oleracea*, muriculate, dark brown.

Extremely common in cultivated ground in the low country, extending up to 3000 ft.

Fl. all the year; lemon-yellow, open in the middle of the day only.

Throughout tropical Asia and Africa, a common weed.

Variable; in dry places often very small, with the stipular hairs very long and shaggy.

4. **P. tuberosa,** *Roxb. Hort. Beng.* 91 (1814). **Úrá-genda,** *S.*
Thw. Enum. 401. C. P. 3638.
Fl. B. Ind. i. 247 (?).

A perennial herb, with a very large, thick, branched, fusiform root, and numerous, prostrate, straggling, succulent, glabrous branches, 6–15 in. long; l. alternate, crowded at ends of branches, very shortly stalked, lanceolate- or linear-oblong, obtuse, rather fleshy, stipular appendages a ring of crisp hairs; fl. solitary, terminal, sessile, with a ring of hair and an involucre of 4 or 5 long leaves; sep. very thin; capsule apiculate; seeds nearly smooth, black.

Rocks on the seashore; rather common on the S.W. coast. Colombo; Bentota; Dondra Head.

Fl. Jan.–Feb.; yellow.

Also in Sind and parts of Peninsular India.

This is probably Roxburgh's plant, but it is doubtful if it be that described in Fl. B. Ind., which is said to have terete leaves and flowers in clusters; and in several other respects the description given does not tally with ours.

5. **P. suffruticosa,** *Wight in Wall. Cat.* n. 6842 (1828).
Thw. Enum. 24. C. P. 1101.
Fl. B. Ind. i. 247 (not given for Ceylon).

A dwarf shrub with a woody, stunted, much-branched rootstock and several short, spreading, prostrate, fleshy branches; l. alternate, $\frac{1}{4}$–$\frac{1}{2}$ in., sessile, terete or oval on section, pointed, stipular appendages a few short, bristly hairs; fl. rather large, solitary, terminal, sessile, with a dense ring of hairs and an involucre of 4–8 long leaves; stam. about 16.

Dry low country, in the crevices of rocks; rather common. Dambulla; Anuradhapura; near Puttalam; Uma-oya. Fl. most of year; salmon-yellow.

Also in Southern India.

In Fl. B. Ind. i. 246, the Ceylon plant is, I know not on what grounds, referred to the very different *P. oleracea;* but the Kew examples are leafless.

XVI.—TAMARISCINEÆ.

TREES; l. scale-like, without stip.; fl. regular, bisexual; sep. and pet. 5, distinct, free, imbricate; stam. 5, distinct; ov. 1-celled, with numerous ovules on 3 basal placentas, styles 3; fruit a 3-valved capsule; seeds with a plume of hair, no endosperm.

TAMARIX, *L.*

(For characters, see *Order.*)—Sp. about 20; 6 in *Fl. B. Ind.*

T. gallica, *L. Sp. Pl.* 270) 1753. **Kiri,** *T.*
T. indica, Willd., Moon Cat. 22. Thw. Enum. 401, 23. C. P. 1254.
Fl. B. Ind. i. 248. Wight, Ill. t. 24 A.

A large shrub or small tree, with slender, articulated branches; l. very small, scale-like, persistent, at first imbricated, afterwards distant, subulate; fl. very small, numerous, shortly pedicellate, closely placed on the long, very slender, spike-like branches of large, terminal panicles, bracts acute, immediately beneath the fl.; sep. oval, obtuse, persistent; pet. acute, rather longer; styles 3; capsule small, $\frac{1}{8}$ in., trigonous, tapering, glabrous, valves flat; seeds several, very small, crowned with a long plume of white hairs.

On the sea-coast; rare. Chilaw; Puttalam; Mullaitivu; Jaffna. Confined apparently to the dry districts. Fl. Feb.; pink.

A sea-coast plant throughout the Mediterranean and extending to India and Burma and tropical Africa. Often planted; the Tamarisk.

[*T. ericoides*, Rottb., given for Ceylon in Fl. B. Ind. i. 249, has not, I believe, been found in the island. Thwaites (Enum. 23) at first referred our *T. gallica* to this species.]

XVII.—ELATINEÆ.

ANNUAL herbs; l. opposite, stipulate; fl. regular, bisexual, in axillary fascicles; sep. and pet. 3 or 5, distinct, imbricate; stam. 3 or 10, distinct; ov. 3- or 5-celled, with many ovules on axile placentas; fruit a septicidally 3- or 5-valved capsule; seeds numerous, without endosperm.

BERGIA, *L.*

For characters, see *Order*.—Sp. 14; 4 in *Fl. B. Ind.*

Stam. 3 . . . . 1. B. AMMANIOIDES.
Stam. 10 . . . . 2. B. VERTICILLATA.

1. **B. ammanioides,** *Roxb. Hort. Beng.* 34 (1814).
Thw. Enum. 23. C. P. 1543.
Fl. B. Ind. i. 251. Hook. Bot. Misc. iii. t. supp. 28. Wight, Ill. i. t. 25 A.

Annual, 6–10 in. high, erect, with many long, often decumbent branches from the base, more or less glandular-pubescent; l. ½–1 in., spathulate-lanceolate, acute, tapering to long base, slightly serrate, stip. lanceolate, serrate, membranous; fl. small, shortly pedicellate, in dense, axillary, sub-verticillate fascicles; sep. 3, acute; pet. 3, obtuse, a little longer; stam. 3; capsule globular, apiculate, valves 3–4, very acute, with inflexed margins, to which the numerous barrel-shaped seeds are attached.

Dry region, in wet and marshy places; common. Jaffna; Mineri; near Badulla. Fl. March.

Throughout tropical Asia, Africa, and Australia, and extends into Persia. The Ceylon plant has the flower nearly always trimerous, and is the var. *triandra*, Wight (*trimera*, Fisch. and Mey.).

Very like *Ammannia lanceolata* in habit and appearance.

2. **B. verticillata,** *Willd. Sp. Pl.* ii. 770 (1799).
Moon Cat. 36. Thw. Enum. 23. C. P. 3551.
Fl. B. Ind. i. 252. Roxb. Pl. Cor. ii. t. 142 (*B. aquatica*).

Annual, aquatic, 1 ft. or more high, with very succulent, glabrous, pink, branched stems, decumbent and rooting at the lower nodes; l. 1–1½ in., nearly sessile, lanceolate, tapering at both ends, subacute, finely serrate, glabrous, stip. triangular, acute, serrate, soon falling; fl. on short ped., crowded in axillary, subverticillate fascicles; sep. 5, lanceolate; pet. 5, oblong, rather longer than sep.; stam. 10; capsule globose, valves 5, broad, apiculate.

Wet places, chiefly on the coast in the dry districts; rather rare. Trincomalie; Batticaloa; Kalutara; Anuradhapura. Fl. March; greenish-white.

Widely spread throughout the tropics.

XVIII.—HYPERICACEÆ.

HERBS or shrubs; l. opposite, entire, no stip.; fl. regular, bisexual, solitary or cymose; sep. and pet. 5, distinct; stam. indef., 1- or 5-adelphous, free; ov. either 1-celled with 3 parietal placentas, or 5-celled with axile placentas; styles distinct; fruit a septicidal capsule; seeds numerous, no endosperm.

HYPERICUM, *L.*

For characters, see *Order.*—Sp. about 160; 19 in *Fl. B. Ind.*

Shrub.	Fls. large and showy	1. H. MYSORENSE.
Herb.	Fls. small	2. H. JAPONICUM.

1. **H. mysorense,** *Heyne in Wall. Cat.* n. 4808 (1828).
H. auritum, Moon Cat. 56. Thw. Enum. 48 C. P. 48.
Fl. B. Ind. i. 253. Wight, Ic. t. 56 (*Norysca mysorensis*).

A much-branched bush, 4–8 ft. high, bark yellow, young branches glabrous; l. numerous, decussate, 1–1½ in., acute, tapering to base, which is amplexicaul with very small, rounded auricles, glabrous, lateral veins very oblique; fl. large, 3 in. diam., terminal, solitary, on short ped.; sep. ½ in., oblong-ovate, acute, with a prominent midrib, persistent; pet. 1¼ in., irregularly oval-oblong, very oblique, obtuse; stam. very numerous, in 5 groups, half as long as pet., spreading; ov. 5-lobed, tapering into 5 long, persistent styles, ovules numerous, on 5 axile placentas; capsule ½ in., valves 5, long-beaked; seeds cylindrical, long.

Upper montane zone; common in open and bushy places. Fl. all the year; bright golden-yellow.
Also on the hills of Southern India.
A remarkably ornamental shrub.

2. **H. japonicum,** *Thunb. Fl. Jap.* 295 (1784).
H. campestre, Moon Cat. 56. Thw. Enum. 48. C. P. 2420.
Fl. B. Ind. i. 256. Royle, Ill. t. 24 (poor).

Annual, erect or procumbent, stem 6–12 in., dichotomous, 4-angled and branched above, glabrous; l. small, ¼–⅜ in., sessile, amplexicaul, ovate or oval, obtuse at both ends, glabrous, with pellucid dots; fl. ¼–⅜ in., solitary, on ped. ¼ in. long, in elongated, dichotomous, leafy cymes; sep. lanceolate, acute, persistent, gland-dotted at the margin; pet. as long as sep., persistent; stam. not very numerous, fil. slightly com-

bined at base; ov. 1-celled, with 3 parietal placentas, styles 3 (rarely 4); capsule ovoid, equalling persistent sep., valves 3.

Throughout the island in ditches, paddy fields, &c., but commoner in the montane region. Fl. all the year; yellow.

Throughout India, and extends to Japan and China, and to Java, Australia, and N. Zealand.

H. humifusum, L. has occurred occasionally about N. Eliya, but certainly introduced there.

XIX.—GUTTIFERÆ.

TREES; l. opposite, entire, without stip; fl. regular, bisexual or polygamo-diœcious; sep. 4–5, imbricate, persistent; pet. 4–8, distinct, much imbricate, rarely 0; stam. indef., distinct or 1–4-adelphous, in fem. fl. reduced to staminodes; ov. 1–many-celled, with 1–4 erect or axile ovules in each cell; fruit usually indehiscent, rarely 2-valved; seeds large, with or without an aril, embryo either a homogeneous mass without cotyledons, or with the cotyledons, large, fleshy, often consolidated, no endosperm (but see under *Calophyllum*).

Stigmas sessile. Embryo a homogeneous mass (*Garcinieæ*)	1. GARCINIA.
Style well developed. Embryo with large cotyledons (*Calophylleæ*).	
Ovary 1-celled, ovule 1	2. CALOPHYLLUM.
Ovary 1-celled, ovules 4	3. KAVEA.
Ovary 2-celled, ovules 4	4. MESUA.

A completely tropical family. Of our 19 species, 15 are found in the low country of the moist region, 4 of them extending also into the dry region, and 3 others up into the lower montane zone. The remaining 4 species—*Garcinia echinocarpa* and 3 species of *Calophyllum*—are confined to the hills, *C. Walkerii*, attaining to the highest elevations.

1. **GARCINIA,** *L.*

Trees; l. thick, smooth; fl. axillary, polygamously diœcious; sep. 4–5; pet. 4–5, imbricate; male fl.:—stam. indef., fil. connate into one or more bundles, anth. dehiscing vertically or transversely, ov. rudimentary or 0; fem. fl.:—stam. (abortive) 10–20, in a single row, usually connected at base, ov. 2–12-celled, with a single axile ovule in each cell, stigma sessile, peltate; fruit fleshy, 1–few-seeded; seeds large,

enveloped in a juicy aril, embryo a solid, homogeneous mass (tigellus), without obvious cotyledons.—Sp. about 50; 30 in *Fl. B. Ind.*

Stam. monadelphous.
  Fruit smooth.
    Fruit deeply grooved . . . . . . 1. G. CAMBOGIA.
    Fruit not grooved. . . . . . . 2. G. MORELLA.
  Fruit tuberculate . . . . 3. G. ECHINOCARPA.
Stam. in 2 or 4 spreading bundles . . . 4. G. TERPNOPHYLLA.
Stam. in 5 erect bundles . . . . . . 5. G. SPICATA.

1. **G. Cambogia,** *Desrouss. in Lam. Enc.* iii. 701 (1789). **Goraka,** *S.* **Korakkaipuli,** *T. Mangostana Cambogia*, Gaertn. Fruct. ii. 106. *G. zeylanica*, Roxb. Fl. Ind. ii. 621 (?). Moon Cat. 37. Thw. Enum. 48. *G. quæsita*, Pierre, Fl. For. Coch. i. 22. C. P. 1172.

Fl. B. Ind. i. 262. Bedd. Fl. Sylv. t. 85. Gaertn. Fruct. ii. t. 105 (fruit). Pierre Fl. For. Coch. i. t. 83 B.

A moderate-sized or large tree, with a round head and rather drooping branches, bark rough, dark brown, young shoots quite glabrous; l. $3\frac{1}{2}$–5 in., lanceolate oblong-lanceolate or oval, much tapering at base, acute or acuminate, glabrous, lateral veins very oblique, petiole $\frac{1}{2}$–$\frac{5}{8}$ in., stout; male fl.:—3 or 4 together in simple umbels in axils of fallen l., ped. $\frac{3}{4}$–1 in., stout, stiff, much thickened upwards; sep. 4, obtuse, very thick; pet. 4, more than twice as long as sep., oval-oblong, obtuse, concave; stam. monadelphous, forming a central globular head; fem. fl.:—larger than male, 1–3 from axils of terminal pair of leaves; sep. and pet. as in male; stam. 10–20, in a ring round ov., free or slightly connate at base; ov. globular, grooved; stigma 7–12-rayed; fr. large, $2\frac{1}{2}$–3 in., more or less globular-depressed, variable in form, with 7–13 (usually 8) very deep vertical grooves forming as many blunt lobes, and a terminal prominent or depressed mamilla, smooth, orange or yellow, pericarp very thick, fleshy; seeds as many as lobes, each surrounded with a copious, juicy, red or white aril, $\frac{3}{4}$ in. long, oval, compressed, testa pale brown, veiny.

Var. β. **Papilla,** *Wight, Ic.* t. 960 and 960-2 (sp.).

L. broadly oval, subobtuse; fruit ovoid, with a long, conical, blunt mamilla.

Low country up to 1500 ft., principally in the moist region; rather common. Var. β. near Colombo (Ferguson). Fl. Feb., March; orange-red.

Also on the western side of Peninsular India.

Koenig's specimens under the native name are in Herb. Mus. Brit.

The fruit varies extremely in the number of grooves, often as many as

12 or 13, and in the shape and depth of the lobes and their colour; one red variety is very like a large tomato. It is ripe in July, and is acid but pleasant; the rind cut into pieces and dried in the sun is much eaten by the natives, and is very palatable.

Wood hard, fine-grained, greyish. The bark affords a transparent gum-resin.

G. zeylanica, Roxb., is referred to this species by Anderson (Fl. B. Ind. l. c.), but Roxburgh's drawing in Herb. Calcutta labelled first '*G. Gutta*,' and altered to '*G. zeylanica*,' appears to be *G. Morella*.

2. **G. Morella,** *Desrouss. in Lam. Enc.* iii. 701 (1789). **Kanagoraka, Gokatu, Kokatiya.**

Herm. Mus. 26. Burm. Thes. 27. Fl. Zeyl. n. 195. *Cambogia Gutta*, L. Sp. Pl. ed. 2, 728. *Mangostana Morella*, Gaertn. l. c. *Stalagmitis cambogioides*, Murr., Moon Cat. 73. *Hebradendron cambogioides*, Graham in Hk. Comp. Bot. Mag. ii. 199. Thw. Enum. 49. C. P. 322.

Fl. B. Ind. i. 264. Bedd. Fl. Sylv. t. 86. Gaertn. Fruct. ii. t. 105 (fruit).

A small pyramidal tree, with spreading branches, bark smooth, brown, young twigs quadrangular; l. 3–4½ in., broadly lanceolate or oval, acute at base, subacute, shining, paler beneath, lateral veins very oblique, inconspicuous, petioles ¼ in.; fl. sessile, in axils of fallen l., male 2 or 3 together, female solitary; sep. and pet. each 4, the latter longer; male fl.:—stam. monadelphous, the fil. combined into a subquadrangular central column but free at their summits, anth. dehiscing transversely; fem. fl.:—stam. about 12 in a ring round ov., connate at base, ov. globular, smooth, 4-celled, stigma peltate, irregularly lobed and tubercled; fr. small, ¾ in., globose, surrounded at base by persistent sep., glabrous; seeds 4, ovoid, kidney-shaped, slightly compressed, testa finely muriculate, blackish-brown.

Moist low country, ascending to about 2000 ft.; common. Kalutara (Moon); Hewesse; Deltota; Balangoda; Hantane; Uva, abundant. Fl. May; greenish-white.

Also on western side of Peninsular India and in East Bengal and the Malay Peninsula.

Wood hard, yellowish-brown. This is the gamboge tree, and yields abundance of that pigment, which is, however, but little collected here. The gamboge of commerce is obtained from Siam, and is the produce of a variety (var. *pedicellata*, Hanb.) of this species, recently raised to specific rank as *G. Hanburii*, Hk. f. It is fully described and figured in 'Medicinal Plants,' t. 33.

3. **G. echinocarpa,** *Thw. in Kew Journ. Bot.* vi. 71 (1854). **Madol,** *S.*

Thw. Enum. 49. C. P. 335, 2445.

Fl. B. Ind. i. 264.

A moderate or large tree, with a thick trunk throwing down many long aërial roots near the ground, bark rather

smooth, dark brown ; l. 3–5 in., broadly oval or somewhat obovate, acute or tapering at base, obtuse, rarely acuminate, with numerous prominent, parallel, lateral veins, petiole $\frac{1}{2}$ in., very stout, usually purple ; fl. sessile, terminal, the male in clusters, the fem. solitary ; male fl. :—sep. and pet. 4, obtuse, thick, concave, the pet. rather the longer ; stam. about 20, monadelphous, the fil. connate to form a 4-sided central column ; fem. fl. :—sep. and pet. as in male ; stam. about 15, in a ring round ov., connate at base ; ov. covered with numerous, imbricated, fleshy scales, 4-celled, stigma peltate, with irregular tuberculated lobes ; fr. 1–1$\frac{1}{2}$ in. long, ovoid, very bluntly beaked, covered with large sharp tubercles ; seeds 1–3, 1 in., subglobular or ovoid, testa thick, reddish-brown.

Moist region, in forests from 1000 up to 6000 ft.; common in the lower montane zone. Adam's Peak ; Deltota ; Singhe Raja Forest, abundant ; especially abundant in the N.E. mountain group, *e.g.*, Hunasgiriya, Madulkelle, Rangala, where it is a principal tree of the hill-forest. Fl. April ; greenish.

Endemic.

Easily recognised by its numerous aërial roots, which are copiously produced from the lower part of the stem, as in the Mangroves. In the low country the leaves are larger and longer and more acute, and the flowers smaller. An oil is obtained from the seeds. Wood light and rather soft ; much used.

4. **G. terpnophylla,** *Thw. Enum. Pl. Zeyl.* 406 (1864). **Kokatiya,** *S.*

Terpnophyllum zeylanicum, Thw. in Kew Journ. Bot. vi. 70 ; Enum. 49. *Discostigma zeylanicum*, Planch. and Tri., Gutt. 209. C. P. 2695.

Fl. B. Ind. i. 268. Kew Journ. Bot. vi. t. 2 C.

A rather small, pyramidal tree, with slender, pendulous branches, bark very smooth, greyish-brown ; l. variable, 3–8 in., from broadly oval to lanceolate-oblong, abruptly or gradually acuminate or attenuate, acute or tapering at base, stiff, paler beneath, lateral veins conspicuous, parallel, inarching with an intramarginal one near the edge, bright lake-pink when young, petiole $\frac{1}{4}$–$\frac{1}{2}$ in., thick ; fl. small, in stalked axillary clusters, ped. $\frac{1}{8}$ in., smooth ; male fl. :—sep. 4, rounded, obtuse ; pet. 4, twice as long as sep., oblong, obtuse ; stam. connate in 2 or 4 spreading, scale-like bundles, opp. the pet. and adnate to their bases, anth. very small, cells distant ; ov. (rudimentary) a short capitate papilla ; fem. fl. :—rather larger, sep. and pet. as in male ; stam. (rudimentary) about 18 triangular scales surrounding ov. ; ov. globular, 2-celled, stigma peltate, irregularly lobed ; fr. $\frac{3}{4}$–1 in., ovoid, bluntly pointed, smooth, 1-seeded ; seed with a membranous testa.

Var. β. **acuminata,** *Thw. l. c.* *Discostigma acuminatum,* Planch. and Tri. l. c. C. P. 3400.

L. smaller, abruptly caudate, obtuse.

Forests in the moist low country, and (according to Thwaites) also up to 4000 ft. in the lower montane zone; rare. Wattegodde; Kalutara; Karawita; Singhe Raja Forest. Fl. Jan.–April, June; pale yellow, scented.

Endemic.

Wood yellow, close-grained, smooth.

5. **G. spicata,** *Hk. f. in Journ. Linn. Soc.* xiv. 486 (1875). **Ela-gokatu, Gonapana,** *S.;* **Kokottai,** *T.*

Xanthochymus ovalifolius, Roxb. Fl. Ind. ii. 632; Thw. Enum. 49. C. P. 1173.

Fl. B. Ind. i. 269 (*G. ovalifolia,* Hk f. non Oliv.).

A rather low tree, with wide-spreading, horizontal branches, bark thick, smooth, brownish, young shoots compressed, 2- or 4-edged, striate; l. 3–4 in., rotundate or broadly oval, rounded at base, very obtuse, retuse, thick and leathery, shining, paler beneath, lateral veins not very prominent, petiole ½ in., very stout; fl. in axils of fallen leaves, the male numerous, crowded in very short racemes, the fem. 2–5 together, ped. slender, ¼–½ in.; male fl.:—sep. 5, very small, pet. 5, many times longer, orbicular, concave, stam. combined into 5 erect, spathulate bundles of 8–10 each; fem. fl.:—sep. and pet. as in male, stam. (abortive) in 5 trifid bundles, ov. ovoid, 3-celled, stigma peltate, 3-lobed; fr. 1–1½ in., ovoid, acute, smooth, 1–3-seeded; seeds 1 in., testa brown, veiny.

Var. β. **acutifolia,** *T. and in Fl. B. Ind.* i. 269.

X. ovalifolius, var. β. Thw. Enum. 50. *G. Thwaitesii,* Pierre, Fl. Forest. Coch.-Chin., Garc. 4. C. P. 731.

A taller tree; l. larger, oval or lanceolate, acute, 5–6 in. long; fr. more globular, on a shorter stalk.

Forests of the dry region; very common. Abundant about Jaffna (Ferguson). Specimen from Koenig in Mus. Brit. Var. β. in the upper zone of the moist low country, 1000–3000 ft.; common. Fl. Feb.–May, July; pale yellow. Also in Southern India.

Wood yellowish, close-grained, heavy. The pulp of the fruit when young affords a chrome-yellow pigment, but no gamboge is produced by the bark.

2. CALOPHYLLUM, *L.*

Trees; l. thick or coriaceous, lateral veins very numerous, close and parallel; fl. in axillary or terminal racemes or panicles, bisexual; sep. 4, in 2 rows, petaloid; pet. 4–8, imbricate, or 0; stam. indef., fil. distinct or slightly connate at base, anth. dehiscing vertically; ov. 1-celled, with a solitary erect ovule; fruit with a thin pulp and crustaceous endocarp;

seed large, cotyledons very large, plane-convex, fused, fleshy, no endosperm (? always).—Sp. about 25; 20 in *Fl. B. Ind.*

Pet. 0.	
Leaves large, 5–10 in.	1. C. SPECTABILE.
Leaves small, 1–2½ in.	
Lves. broadly oval or obovate . .	2. C. BURMANNI.
Lves. lanceolate or oval, tapering to apex	3. C. PULCHERRIMUM.
Pet. 4.	
Inflor. shorter than leaves.	
Young parts glabrous	4. C. INOPHYLLUM.
Young parts rufous-tomentose.	
Lves. all similar	5. C. TOMENTOSUM.
Lves. of two kinds	6. C. BRACTEATUM.
Inflor. equalling or longer than leaves.	
Lves. small, 1–3 in.	
Lves. rounded or cordate at base .	7. C. THWAITESII.
Lves. acute at base.	
Inflor exceeding leaves . . .	8. C. TRAPEZIFOLIUM.
Inflor. equalling leaves . . .	9. C. CUNEIFOLIUM.
Leaves large, 4–6 in.	10. C. CORDATO-OBLONGUM.
Pet. 8 (see also 9 and 10)	11. C. WALKERII.

1. **C. spectabile,** *Willd. in Mag. Berol.* (1811), 80. **Dombakina,** S.

C. Moonii, Wight, Ill. i. 129; Thw. Enum. 52; Planch. and Tri., Mem. Gutt. 241. C. P. 3402.

Fl. B. Ind. i. 271. Wight, Ic. t. iii.

A large pyramidal tree, with horizontal branches, bark smooth, yellowish-grey, young shoots ferrugineous-tomentose; l. 5–10 in., lanceolate-oblong, acute at base, subacute, margin slightly recurved, lat. veins very fine and close, petiole ½–¾ in., very stout, pubescent, becoming glabrous; fl. ⅓ in., in small, erect, axillary panicles or umbellate clusters, ped. ⅓–½ in.; sep. 4, roundish-oval, nearly equal; pet. 0; fr. subglobose, apiculate, smooth.

Moist low country; rare, and apparently confined to Hewesse and Singhe Raja forests in Pasdun Korale. Moon's specimens were collected 'between Horana and Nambapane.' Fl. December to March.

Also in many parts of the Malay Peninsula and in Java, Fiji, and Society Islands.

Wood reddish, moderately hard, rather light; attains large dimensions.

2. **C. Burmanni,** *Wight, Ill.* i. 129 (1838). **Gurukina, Hinkina,** *S.*, **Chirupunnai,** *T.*

Herm. Mus. 11. Burm. Thes. 130. Fl. Zeyl. n. 202. *C. Calaba*, L. Sp. Pl. ed. 2, 723 (in part). Moon Cat. 41. Thw. Enum. 52. Planch. and Tri. l. c. 233. C. P. 242, 2447.

Fl. B. Ind. i. 272. Wight, Ic. tt. 107, 108. Burm. Thes. t. 60.

A small, round-headed, much-branched tree, bark thick and furrowed, twigs quadrangular, buds and young parts with

an easily detached rufous tomentum; l. $1\frac{1}{2}$–$2\frac{1}{2}$ in., broadly oval or obovate, very obtuse, tapering to short, thick petioles, stiff, lat. veins very fine, close and prominent on both sides, glabrous; fl. $\frac{1}{2}$–$\frac{3}{4}$ in. diam., on slender glabrous ped. $\frac{1}{2}$–$\frac{3}{4}$ in., arranged in stalked, axillary, spreading panicles usually shorter than the leaves; sep. 4, spreading, obtuse, the inner 2 much the longer; pet. 0; stam. erect; fr. subglobose or ovate-ovoid, $\frac{1}{2}$–$\frac{5}{8}$ in., tipped with persistent style, smooth, bright orange; seed ovoid, testa thin, pale brown.

Low country, especially on the coast and in the dry districts; common. Jaffna; Chilaw; Batticaloa; Bentota; Colombo; and inland at Kurunegala; Deltota; Ratnapura. Fl. March–May; white.

Endemic (?) (Cochin China (?)

Specimens from Jonville, 1800, are in Mus. Brit.

A remarkable variety with oblong fruit, sent by Mr. Vincent from the sea-coast of the Eastern Prov., requires further examination.

The embryo appears quite solid and homogeneous, and I fail to see the structures shown in Wight's figures. On a careful examination, however, a transverse line is to be detected on a cross section, and with some difficulty the mass can be separated into the two thick more or less fused plane-convex cotyledons.

Linnæus included also a W. Indian species under his *C. Calaba*, and to that the name is now usually restricted.

Heart wood red, rather hard and heavy.

3. **C. pulcherrimum,** *Wall. Cat.* 4848 (1828) (?)
Trimen in Journ. Bot. xxvii. 161.
Fl. B. Ind. i. 271. Pierre Fl. For. Coch.-Chine, t. 104.

A small, slender tree, with very smooth, bright yellow bark, twigs quadrangular, buds finely pubescent; l. $1\frac{1}{4}$–$2\frac{1}{2}$ in., lanceolate or oval, tapering at both ends but actual apex obtuse, petiole $\frac{1}{4}$ in., lat. veins prominent on both sides; fl. $\frac{1}{4}$–$\frac{3}{8}$ in. diam., about 5 together in small axillary racemose or umbellate stalked clusters much shorter than the l., ped. $\frac{1}{4}$–$\frac{1}{2}$ in., very slender, glabrous; sep. and pet. as in last; fruit not seen.

Moist low country; very rare. Only seen in Mandagala Forest, Hewesse, Pasdun Korale, by the stream. Fl. March; white.

Also in Malay Peninsula, Sumatra, Banca.

I feel some doubt as to the name of this, but Pierre's plate above quoted appears to represent it. *C. floribundum*, Hk. f., seems scarcely to differ. Specimens from Col. Walker in Wight's Herb. (Hb. Kew) labelled '*C. Burmanni, var. parvifolium*' may perhaps be the same.

Differs from *C. Burmanni* in habit and locality, in the narrower and more tapering leaves, and in the fewer and much smaller flowers. The bright yellow bark is also very distinctive.

4. **C. Inophyllum,** *L. Sp. Pl.* 513 (1753). **Domba, Tel-domba, Punnai, Dommakottai,** *T.*

Herm. Mus. 15. Burm. Thes. 170. Fl. Zeyl. n. 201. Moon Cat. 41. Thw. Enum. 51. C. P. 2764.
Fl. B. Ind. i. 273. Wight, Ic. t. 77.

A moderate-sized tree, with a thick trunk and smooth, grey bark, buds glabrous; l. large, 4–8 in., oval or oblong-oval, acute at base, acute or emarginate, smooth and shining, petiole short, $\frac{1}{4}$–$\frac{3}{4}$ in., stout, flat; fl. 1–1$\frac{1}{4}$ in. diam., in stalked racemes from the upper leaf-axils and shorter than l., ped. $\frac{1}{2}$–$\frac{3}{4}$ in., stout, glabrous; sep. 4, ovate, obtuse, concave, reflexed, the 2 inner longer; pet. 4, oblong, obtuse, spreading; stam. very numerous, spreading, fil. connate at base into 4 or 6 bundles; style long, twisted, stigma large, capitate; fr. large, globose, 1$\frac{1}{4}$–1$\frac{1}{2}$ in., quite smooth, outer pulp very scanty, endocarp spongy-woody, seed 1 in. long.

Low country, principally on the sea-coast; common. Fl. May; white, sweet-scented.

On or near the sea-shore throughout the Eastern Tropics, and often cultivated in inland localities.

A very ornamental tree.

The fruits are the 'Punnai nuts' of commerce, and are exported to India; they afford abundant oil. Wood rather hard, tough, reddish-brown, closely grained; much used.

5. **C. tomentosum,** *Wight, Ill.* i. 128 (1840). **Kina,** *S.*
Planch. and Tri. l. c. 241. Thw. Enum. 51. C. P. 1171.
Fl. B. Ind. i. 274. Wight, Ic. t. 110.

A large tree, with straight trunk, twigs quadrangular and with the buds densely tomentose with rusty hair; l. numerous, 4–5 in., lanceolate or oblong-lanceolate, acute at base, bluntly acuminate, stiff, slightly undulated, veins very fine, conspicuous beneath, petioles $\frac{1}{2}$–$\frac{3}{4}$ in., stout, densely pubescent, afterwards glabrous; fl. numerous, $\frac{3}{4}$–1 in. diam., in lax, axillary racemes or panicles shorter than the l., ped. slender, tomentose; sep. and pet. as in the last but smaller; fr. nearly globular, $\frac{3}{4}$ in., apiculate, smooth.

Moist country at elevations of 2000–4000 ft.; common. Fl. March, April, Nov.; white.

Also in Western India (?).

This is the ordinary 'kina' of the lower hill-country, and its seeds afford orange-coloured oil, 'kina-tel,' much used by the natives. Wood pale red, rather light, smooth.

C. elatum, Bedd. is recorded by Mr. Vincent in his Forest Report (pt. 1, pars. 106 and 147) from the Eastern Prov., where it is called 'Tombu-kata.' Also sent by Capt. Walker from the Devilane Forest, near Batticaloa. I have seen only leaves of this, and am not certain of the name. *C. elatum* is figured in Beddome's Fl. Sylvat. t. 2, and in his Forest Report for 1863–4, and is referred in the Fl. B. Ind. to *C. tomentosum* (see Journ. Bot. 1885, 142). The leaves of our plant are much

longer than in Beddome's plate, and the tree may perhaps be *C. angustifolium*, Roxb.

6. **C. bracteatum,** *Thw. Enum. Pl. Zeyl.* 51 (1858. **Walu-kina,** *S.*
C. acuminatum, Moon Cat. 41. Thw. Enum. 51. Planch. and Tri. l. c. 252. C. P. 2674.
Fl. B. Ind. i. 274.

A large tree, with smooth bark and pendulous branches, young shoots and buds with ferrugineous tomentum ; l. dimorphic, the ordinary ones 4–8 in., lanceolate-oblong, acute at base, acuminate, sub-obtuse, petiole $\frac{1}{2}$ in. often twisted, the other ones smaller, in groups of 2–4 pairs at intervals on the branches, closely placed and overlapping, nearly sessile, 1–2 in., oblong-linear, acute, pubescent ; fl. small, less than $\frac{1}{2}$ in. diam., in small, axillary racemes much shorter than the leaves, ped. pubescent, with a conspicuous, oblong, very pubescent bract at the base of each ; pet. 4, ovate, obtuse ; fr. ovoid, $\frac{5}{8}$–$\frac{3}{4}$ in., apiculate.

Moist low country, in wet forests ; rather rare. Palabadalla, &c., frequent ; Hewesse ; Kukul Korale. Fl. Feb. March ; white.

Endemic.

When young the leaves are white and flaccid and hang perpendicularly downwards like those of *Humboldtia*, *Saraca*, *Amherstia*, and other *Cæsalpineæ*.

The dimorphic leaves give this tree a very singular appearance. The smaller leaves appear to be of the nature of persistent bud-scales, and to mark periods of less vigorous growth. Thwaites' name *bracteatum* refers to the conspicuous bracts of the inflorescence ; not, as thought by Planch. and Tr. (l. c.) to the dimorphic leaves.

7. **C. Thwaitesii,** *Planch. and Tri. in Ann. Sc. Nat.* s. 4, xv. 260 (1861).
Thw. Enum. 407. *C. decipiens*, Thw. Enum. 51 (non Wight). C. P. 3403, 3401 (?).
Fl. B. Ind. i. 275.

A much-branched tree, twigs quadrangular ; l. $1\frac{1}{4}$–3 in., orbicular or broadly obovate, obtuse or retuse, rounded or cordate at base, very thick and leathery, lat. veins coarse, prominent above, petiole very short ; fl. large, nearly 1 in. diam., in stalked axillary racemes much exceeding the l., ped. glabrous ; fr. nearly globular, $\frac{5}{8}$ in.

Moist country, from 1000–4000 ft.; rare. Nillowe Kande ; Ambagamuwa ; Adam's Peak. Fl. March, April ; yellowish-white.

Endemic.

C. P. 3401 is considered to be a young state of this species by Thwaites. The specimens are from Singhe Raja, and consist of leaves only, which are long-oblong, obtuse, sessile, and amplexicaul.

8. **C. trapezifolium,** *Thw. Enum. Pl. Zeyl.* 51 (1 58).
Planch. and Tri. l. c. 254. C. P. 2446.
Fl. B. Ind. i. 275.

A large or small tree, twigs quadrangular, glabrous; l. small, $1\frac{1}{2}$–$2\frac{1}{2}$ in., obovate-oval or slightly rhomboid, acute at base, obtuse or bluntly acuminate, lat. veins fine, petioles very short; fl. large, nearly 1 in. diam., in few-fld. axillary racemes at the ends of the branches and exceeding the l., ped. long, $\frac{3}{4}$ in., bracts $\frac{3}{8}$ in., glabrous; sep. and pet. 4, spreading, the latter longer; fr. globular-ovoid, $\frac{3}{4}$ in., pointed, smooth.

Lower montane zone; rare. Only in N. E. mountain region, between 4000–5000 ft. Madulkelle; Rangala; Hunasgiriya. Fl. April; white.
Endemic.

Thwaites has described the seed of this species (Kew Journ. Bot. vi. 72) as having a moderate-sized well-developed deep green embryo immersed in an abundant endosperm; and his original drawing at Peradeniya shows this structure. I have not had the opportunity of examining the seed, so as to be able to confirm this. The curious 2-lipped galls described under *C. Walkeri* occur also in this species.

A plant from Dolosbagie (in fruit only) may be this, but has longer leaves and the fruit more acuminate.

9. **C. cuneifolium,** *Thw. Enum. Pl. Zeyl.* 51 (1858).
Planch. and Tri. l. c. 261. C. P. 2917.
Fl. B. Ind. i. 275.

A large tree, with dark bark, twigs glabrous; l. small, $1\frac{1}{2}$–2 in., rhomboid-lanceolate or spathulate, obtuse or retuse, tapering to cuneate base and short petiole, veins coarse, very prominent; fl. $\frac{3}{4}$ in., in erect, axillary racemes scarcely longer than the l., ped. stout, glabrous; sep. 4, two inner larger; pet. 4–8, inner ones shorter; fr. globular, $\frac{1}{2}$ in., smooth.

Lower montane zone; very rare. Nugatenne; Medamahanuwara; Debedde near Badulla. Fl. June; white.
Endemic.

10. **C. cordato-oblongum,** *Thw. Enum. Pl. Zeyl.* 407 (1864).
C. P. 3823.
Fl. B. Ind. i. 275.

A very large tree, twigs quadrangular, at first pilose with ferrugineous hair; l. large, 4–6 in., oblong-oval, obtuse, very shortly stalked, cordate at base, margins slightly recurved, very coriaceous, veins rather coarse, prominent; fl. large, 1 in. or more diam., in terminal panicles equalling or somewhat exceeding the l., ped. very stout, tomentose; sep. 4, two outer densely tomentose outside, two inner much longer, with a hairy midrib; pet. 4, orbicular, $\frac{1}{2}$ in.; fr. not seen.

Moist low country; very rare. Only found in Hiniduma Reserved Forest, in Sept. 1863.
Endemic.

The large tomentose flower-buds readily distinguish this handsome species.

11. **C. Walkerii,** *Wight, Ill.* i. 128 (1840). **Kina,** *S.*
Planch. and Tri. l. c. 263. C. P. 1170.
Fl. B. Ind. i. 275 (localities omitted). Wight, Ill. i. t. 45 (poor).

A very large tree, with a thick, straight, tall trunk and a rounded head, bark reddish-brown, thick, twigs quadrangular, glabrous; l. small, $1\frac{1}{4}$–2 in., crowded, rotundate or obovate-oval or obcordate, cuneate or rounded at base, obtuse, very stiffly coriaceous, lat. veins coarse, not prominent, petioles very short, stout; fl. large, 1 in. diam., numerous, in axillary and terminal racemes forming together a large terminal panicle much exceeding the l., ped. $\frac{1}{2}$–$\frac{3}{4}$ in., glabrous; sep. 4, inner twice as long; pet. usually 8, longer than sep., inner row smaller; stam. very numerous, slightly coherent at base; fr. globose, $\frac{3}{4}$ in. or rather more, apiculate, smooth, pale yellow mottled with brown.

Upper montane zone in forests; common. N. Eliya; Adam's Peak; Ambagamuwa; Knuckles. There is a specimen from Moon in Mus. Brit. without definite locality. Fl. Jan.–April; white or pinkish (not yellow as in Wight's fig.).

Endemic.

The well-known 'Kina' tree of the mountains, growing often to an immense size. The flowers are very beautiful and sweet-scented, and are said to be produced only once in 3 or 4 years. Wight's plate gives a very poor idea of this fine species.

Wood pale reddish-brown, hard, rather light, durable.

This is liable to very curious terminal galls which have been often mistaken for fruit; they are urceolate in form with a 2-lipped chink at the summit, and appear to be formed by the fusion and malformation of a pair of opposite leaves. They occur in other species also of this genus.

3. KAYEA,* *Wall.*

Trees; l. with lateral veins arched, inconspicuous; fl. bisexual, in axillary racemes; sep. 4, in 2 rows, much enlarged in fr.; pet. 4, imbricate; stam. very numerous, distinct, anth. dehiscing vertically; ov. 1-celled, with 4 erect ovules, style very long, stigma 4-fid; fr. coriaceous, indehiscent, enclosed in enlarged sep., 1–4-seeded, embryo with large fleshy cotyledons.—Sp. 4; all in *Fl. B. Ind.*

K. stylosa, *Thw. Enum. Pl. Zeyl.* 50 (1858). **Suwanda,** *S.*
K cuspidata, Planch. and Tri. l. c. 268. C. P. 2708.
Fl. B. Ind. i. 276. Bedd. Fl. Sylv. t. 102.

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* Commemorates Dr. Robert Kaye Greville, of Edinburgh, a distinguished botanist Died 1866

A large tree; l. small, 2–3 in., lanceolate or oval, rounded at base, acuminate, acute and often cuspidate at apex, stiff, not coriaceous, glabrous, lat. veins faint, connected by fine reticulate venation conspicuous beneath, petioles $\frac{1}{4}$–$\frac{1}{3}$ in.; fl. small, under $\frac{1}{2}$ in. diam., in stalked, erect, axillary racemes longer than l., ped. slender, glabrous, thickened upwards; sep. thick, concave, persistent; pet. very concave, longer than sep., obtuse; stam. spreading, shorter than pet., persistent; style stout, much longer than stam., branches of stigma subulate; fr. enveloped in the very greatly enlarged coriaceous imbricate sep., depressed-spherical, $\frac{3}{4}$–1 in. diam., tipped with persistent base of style, pericarp coriaceous; seeds 1–4, large, angular, dark red.

Moist low country; very rare (?). Kalutara. Fl. Sept.; white, sweet-scented, buds red.

Endemic.

Wood brownish-red, fine grained, rather soft.

4. **MESUA,** *L.*

Trees; l. with lateral veins inconspicuous; fl. axillary, bisexual; sep. 4, in 2 rows; pet. 4, imbricate; stam. very numerous, distinct, anth. dehiscing vertically; ov. 2-celled, with 2 erect ovules in each cell, style long, stigma peltate; fruit surrounded by enlarged sep., woody-coriaceous, 2-valved; seeds 1–4, cotyledons fleshy, plano-convex, coherent.—Sp. 3 or more; all in *Fl. B. Ind.*

Leaves oblong-lanceolate, 3–4 in. . . . . . 1. M. FERREA.
Leaves linear-oblong, 8–12 in. . . . . . . 2. M. THWAITESII.

1. **M. ferrea,** *L. Sp. Pl.* 515 (1753). **Na,** *S.* **Naka,** *T.*

Herm. Mus. 7. Burm. Thes. 25. Fl. Zeyl. n. 203. Moon Cat. 51. *M. Nagaha*, Gardn. in Calc. Journ. Nat. Hist. viii. 4. Thw. Enum. 50. Pl. and Tri. l. c. 271. *M. Walkeriana*, Pl. and Tri. l. c. 273. *M salicina*, Pl. and Tri. l. c. 274. C. P. 602.

Fl. B. Ind. i. 277 (not given for Ceylon). Wight, Ic. t. 118.

A moderate-sized tree, pyramidal till old, much branched, bark smooth, pale, young branches virgate, thickened at nodes, twigs nearly cylindrical, glabrous; l. numerous, spreading, 3–4 in., oblong-lanceolate, acute at base, acuminate, obtuse, coriaceous, glabrous and shining above, covered with dense white powder beneath, lateral veins fine, quite inconspicuous, petioles short, $\frac{1}{4}$–$\frac{1}{3}$ in.; fl. large, 3–4 in. diam., axillary (often apparently terminal), solitary, nearly sessile; sep. rotundate, very obtuse, much cupped, somewhat reflexed,

finely puberulous outside, persistent, the inner pair twice as long as the outer; pet. 2 in., obovate, with a broad cuneate base, crisped and undulated, wide-spreading, fugacious; stam. very much shorter than pet.; ov. pyramidal, compressed, style twice as long as stam., stigma capitate, 2-lobed; fr. surrounded by the enlarged crustaceous sep., ovoid or sub-globular, pointed, 1–1¼ in., pericarp tough, semi-woody, ultimately 2-valved; seeds 1–4, angular, testa crustaceous, smooth, chestnut brown.

Var. β. **sclerophylla,** *Thw. Enum.* 407 (sp.). *M. speciosa*, var. β. Thw. Enum. 50. C. P. 603.

L. rounded at the base, very thick and rigid, veins quite hidden.

Var. γ. **pulchella,** *Planch. and Tri.* l. c. 279 (sp.). *M. coromandelina*, Thw. Enum. 50 (non Wight). Thw. Enum. 407. C. P. 3404.

L. quite without white powder beneath; fl. 1–3 together in axils.

Forests of the low country especially in the moist region; common. Var. β. four or five trees only in Reigam Korale. Var. γ. in Singhe Raja Forest. A very narrow-leaved form (*M. salicina*, Planch. and Tri.) abundant at Galagama. Fl. April–June; sep. bright pink, pet. white. anth. orange, fil. lemon-yellow. Very sweet-scented.

Throughout Indian and Malay Peninsula and Andaman Is.

One of our most beautiful trees, and much planted, especially near Buddhist temples. The large fl. are deliciously scented, and the young leaves of an intense blood-red passing into the dark green of the adult growth through delicate shades of pink.

The 'Iron wood' of the English. Wood very hard and heavy, dark red, extremely durable.

An oil is obtained from the seeds.

2. **M. Thwaitesii,** Planch. and Tri. in Ann. Sc. Nat. 4. xv. 305 (1861). **Diya-na,** *S.*

M. speciosa, Thw. Enum. 50 (non Chois.). Thw. Enum. 407. C. P. 1675.

Fl. B. Ind. i. 278.

A tree, with rather smooth bark, young parts glabrous; l. very long, 8–12 in., linear-oblong, rounded or narrowed at base, acuminate, coriaceous, glabrous, covered with white powder beneath, petiole ½ in.; fl. very large, 3–4½ in. diam., sessile, 1–3 together on a short peduncle in leaf-axils, each surrounded by 2 or 3 large adpressed bracts; fr. surrounded by enlarged sep. and bracts, depressed-globose, apiculate, valves very thick; seeds 2, testa dark brown, smooth.

Moist low country in forests, near streams; rather common. Ratnapura; Kitulgala; Palabadulla; Labugama.

Fl. April; white. To judge from a drawing in Herb. Perad. the petals are sometimes increased in number.

Endemic.

Wood as in *M. ferrea.*

XX.—TERNSTRŒMIACEÆ.

TREES or shrubs; leaves alternate, simple, without stip.; fl. regular, bisexual or diœcious, usually bracteate; sep. 5 (rarely 3 or 4), distinct, often unequal; pet. 5, distinct or connate at base, imbricate; stam. numerous (rarely few), distinct or 5-adelphous, free or adnate to base of pet.; ov. 2–5-celled, with numerous (rarely 1–2) ovules in each cell (rarely 1-celled, with 3 parietal placentas), styles more or less connate; fruit indehiscent, or a loculicidal capsule; seeds with scanty endosperm.

Fruit indehiscent, anthers basifixed.
  Fls. bisexual.
    Stam. glabrous. Seeds 2–4 . . . . . 1. TERNSTRŒMIA.
    Stam. hairy. Seeds numerous . . . . . 2. ADINANDRA.
  Fls. diœcious . . . . 3. EURYA.
Fruit dehiscent, anthers versatile . . . . . 4. GORDONIA.

With the exception of *Eurya acuminata* all our 7 species are montane.

1. **TERNSTRŒMIA,** *L.*

Trees or shrubs; leaves coriaceous, lat. veins invisible; fl. axillary bisexual; sep. 5; pet. 5; stam. numerous, anth. introrse, connective somewhat prolonged; ov. 2-celled, with 1 or 2 ovules in each cell; fr. indehiscent, 2–4-seeded; seeds large.—Sp. 25; 3 in *Fl. B. Ind.*

Leaves subacute, fls. yellow . . . . . . 1. T. JAPONICA.
Leaves very obtuse, fls. white . . . . . . 2. T. EMARGINATA.

1. **T. japonica,** *Thunb. in Trans. Linn. Soc.* ii. 335 (1794).
Cleyera gymnanthera, W. and A., Thw. Enum. 40. C. P. 778.
Fl. B. Ind. i. 280. Bedd. Fl. Sylv. t. 91 (*T. gymnanthera*).

A moderate-sized, much-branched, tree; bark thick, soft; young shoots glabrous; l. $1\frac{1}{2}$–3 in., closely placed, lanceolate or oval, tapering at base, slightly acuminate, subacute, entire, thick, petioles $\frac{1}{3}$ in., stout, red; fl. $\frac{1}{3}$–$\frac{1}{2}$ in. diam., solitary, in axils of fallen l., ped. $\frac{1}{3}$–$\frac{1}{2}$ in., rather stout, curved, glabrous, bracts 2, immediately beneath fl., oval, obtuse; sep. rounded,

with narrow scarious margins ; pet. twice the length of sep., rounded, spreading ; anth. apiculate ; fr. surrounded at base with persistent bracts and sep., $\frac{3}{4}$ in., ovate-ovoid, tipped with persistent style, fleshy, brown ; seeds 3–4, testa very hard.

Montane zone, descending to about 4000 ft.; common. N. Eliya ; Hakgala ; Dimbula ; Maturata ; Deltota ; Rangala ; Haputale. Fl. April, May ; yellow.

Also in the Nilgiris, East Bengal, the Malay Peninsula and Sumatra, China and Japan.

Wood even-grained, pinkish-brown, rather heavy, durable; called by the carpenters in the hill districts 'Pena-mihiriya,' 'Rattota,' and 'Ratatiya.' The bark is chewed.

2. **T. emarginata,** *Choisy, Mem. Tern.* 14 (1855).
Cleyera emarginata, Gardn. in Calc. Journ. Nat. Hist. vii. 447. Thw. Enum. 40. C. P. 782.
Fl. B. Ind. i. 281.

A shrub, 10–16 ft., young twigs glabrous ; l. crowded, $1\frac{1}{2}$–$2\frac{1}{4}$ in., sessile, obovate-spathulate, very much attenuate at base, obtuse, usually emarginate, faintly crenate-serrate in upper part, coriaceous, margin revolute ; fl. solitary from axils of fallen leaves, $\frac{1}{2}$–$\frac{3}{4}$ in. diam., ped. $\frac{3}{4}$, erect, thickened and curved at top ; sep. and pet. as in last ; anth.-cells distant, connective prolonged ; style deeply bifid, shorter than stam.; fr. $\frac{1}{2}$–$\frac{3}{4}$ in., oblong-ovoid, pointed, tipped with persistent style ; 2-seeded.

Upper montane zone, especially by streams ; rather rare. Horton Plains, abundant ; near Adam's Peak ; Maskeliya ; Ambagamuwa. Fl. Feb., March ; white becoming purplish-yellow.

Endemic.

2. ADINANDRA, *Jack.*

Trees ; fl. axillary, bisexual ; sep. 5 ; pet. 5 ; stam. numerous, hairy, anth. introrse ; ov. 1-celled, with 3 parietal placentas (apparently 3-celled), with numerous ovules ; fruit fleshy, indehiscent ; seeds numerous, very small.—Sp. 10 ; 8 in *Fl. B. Ind.*

A. lasiopetala, *Choisy, Mem. Tern.* 24 (1855). [PLATE IX.]
Cleyera lasiopetala, Wight, Ill. i. 99. *Eurya lasiopetala*, Gard. l. c. 446. *Sarosanthera lasiopetala*, Thw. Enum. 41. C. P. 775.
Fl. B. Ind. i. 283. Bedd. Fl. Sylv. Anal. Gen. t. iii. f. 3.

A small, slender tree, 20–30 ft., young parts minutely hairy ; l. $2\frac{1}{2}$–4 in., oblong-lanceolate, tapering to base, obtuse, entire or faintly denticulate, margin recurved, glabrous above, minutely pubescent beneath, petiole very short ; fl. rather large, $\frac{3}{4}$ in., solitary, axillary, petioles $\frac{1}{2}$ in., very stout, thickened

above, pubescent, stiffly recurved, bracts 2, immediately beneath fl., triangular, acute; sep. very obtuse, rough or the inner 2 hairy on the back, with scarious margins; pet. twice as long as sep., covered on back with dense, silky hair; stam. about 18, adherent to base of pet., sparsely hairy throughout; ov. with 3 bifid, revolute, parietal placentas, style short, stigmas 3, obtuse; fr. surrounded by persistent sep., globose, $\frac{1}{2}$ in., apiculate, dry-fleshy, 3- or 6-celled; seeds kidney-shaped, black, shining, punctate.

Upper montane zone; rather common. N. Eliya: Hakgala; Horton Plains; Maturata; Dimbula. Fl. Feb.–May; white.

Endemic.

The Nuwara Eliya carpenters give the name of 'Ratu-mihiriya' to the wood of this tree.

3. **EURYA,** *Thunb.*

Shrubs; fl. small, axillary, surrounded by small bracts, diœcious; sep. 5; pet. 5, connate at base; stam. 5–20, glabrous; ov. 3-celled, ovules several in each cell, styles 3, more or less connate below; fruit a dry, indehiscent berry, 3-celled; seeds several, endosperm scanty.—Sp. about 10; 6 in *Fl. B. Ind.*

Leaves oval or lanceolate . . . . 1. E. JAPONICA.
Leaves narrowly oblong-lanceolate . . . . . 2. E. ACUMINATA.

1. **E. japonica,** *Thunb. Fl. Jap.* 191 (1784). **Neya-dasse,** *S.*
E. elliptica, Gardn. l. c. 443. Thw. Enum. 41. C. P. 777.
Fl. B. Ind. i. 284, 5. Wight, Ill. i. t. 38 (*E. Wightiana*). Bedd. Fl. Sylv. t. 92.
Presents itself under several varieties.

Var. *α.* **Thunbergii,** *Thw. l. c.*

A shrub, 6–16 ft., young twigs glabrous, striate; l. 2–4 in., nearly sessile, oval or lanceolate, acute at base, acuminate, obtuse or retuse, serrate at the upper part, glabrous, veins prominent beneath; fl. very small, 1–2 together in the leaf-axils, ped. short, bracts 2 or more beneath the fl., obtuse; sep. orbicular, obtuse, glabrous, persistent; stam. 5–15; fr. $\frac{1}{6}$ in., ovoid, tipped with persistent style, glabrous.

Var. *β.* **zeylanica,** *Wight, Ill.* i. 98 (sp.). Gardn. l. c. 444. C. P. 2600.

Twigs very hairy; l. $1\frac{1}{2}$–$2\frac{1}{2}$ in., petiole and midrib beneath hairy, margin somewhat revolute; stam. 14; berry often pilose.

Var. *γ.* **chinensis,** *Br. in Abel Voy.* 379 (1818). *E. parvifolia*, Gardn. l. c. 445. C. P. 784.

Twigs hairy; l. ¾–1 in., very rigid, glabrous, margin very strongly revolute; stam. 6–10.

Montane zone from the highest elevations down to about 4000 ft.; very common. Fl. all the year; white.

Mountains of India and Malaya, extending to the Fiji Is. and to China and Japan.

These varieties are considered species in Fl. B. Ind., but I agree with Thwaites that no permanent characters can be found to separate them.

2. **E. acuminata,** *DC. Mem. Tern.* 26 (1855).
E. japonica, var. *β.* Thw. Enum. 41. *E. membranacea*, Gardn. l. c. 444 (?) C. P. 1078.
Fl. B. Ind. i. 285. Royle, Ill. t. 25.

A shrub, 8–10 ft., twigs sparsely hairy, buds silky; l. 2½–3 in., narrowly oblong-lanceolate, long-acuminate or caudate serrulate, glabrous except on midrib beneath; fl. 2–5 together in the axils; stam. 12–20. Otherwise as in *E. japonica.*

Moist low country, extending up to 2000 ft.; very common. Fl. all the year; white.

Also in Eastern Himalaya, Assam, Malay Peninsula and Islands.

Thwaites combines this also with *E. japonica*, and perhaps rightly, but it is readily separable by its narrow attenuated leaves.

The habit and foliage of these species of *Eurya* are very like those of Tea, and young plants have been frequently mistaken for it, and even cultivated in nurseries. Hence the plant has acquired the name of 'Wild Tea' among the planters.

4. GORDONIA,* *Ellis.*

Trees; fl. large, solitary, axillary, bracteate, bisexual; sep. 3–5, unequal; pet. 5, often connate at base; stam. very numerous, free or in 5 bundles, adnate to base of pet., anth. versatile; ov. 5-celled, with several ovules in each cell, style simple, stigma 5-lobed; fruit a woody capsule, dehiscing loculicidally into 5 hard valves and a central axis; seeds numerous, compressed, with an oblique oblong wing on one side above; cotyledons ovate, flat or plicate.—Sp. 10; 6 in *Fl. B. Ind.*

Stam. not connate. Fl. white . . . . . . 1. G. ZEYLANICA.
Stam. connate in 5 bundles. Fl. crimson . . . 2. G. SPECIOSA.

1. **G. zeylanica,** *Wight, Ill.* i. 99 (1840).
Thw. Enum. 40. C. P. 788, 2417.
Fl. B. Ind. i. 291.

* In memory of James Gordon, a London nurseryman, and correspondent of Linnæus.

A moderate-sized or large tree, young shoots silky-pubescent; l. on very short thick petioles, 3–5 in., lanceolate or oval or oblong-lanceolate, acute or rounded at base, acuminate, acute or subacute, entire, margin sometimes revolute, glabrous, paler and veinless beneath; fl. large, 1½–3 in., axillary, solitary, ped. under ½ in.; sep. rotundate, stiff, scarious at margins, 2 inner much larger, glabrous, ciliate; pet. very much longer than sep., rotund, with a broad claw, pilose externally at the base; stam. not connate at base, anth.-cells curved; capsule 1–1½ in., surrounded at base by persistent sep., oblong-ovoid, obtuse, apiculate, valves triangular in section; seeds flattened, pale brown.

Var. β. **elliptica,** *Gardn. in Calc. Journ. Nat. Hist.* vii. 448 (1846) (sp.).

Young shoots glabrous; l. sessile, broadest at the base, very obtuse at both ends; fl. sessile, rather larger; sep. puberulous outside.

Montane zone in the forests 4000–7000 ft.; common. Haputale; N. Eliya; Dimbula; Maturata; Hakgala; Hunasgiriya; Rangala. Var. β. Elephant Plains, 6000 ft. (Gardner). Fl. Sept.–Nov.; white.

Endemic.

Gardner's *G. elliptica* is kept up as a species in Fl. B. Ind. I can see no difference from *G. zeylanica* save the shorter and somewhat broader leaves; it is No. 93 of Gardner's plants. C. P. 2417 referred to it by Thwaites is intermediate between it and the type. I have never seen either leaves or flowers absolutely sessile.

Wood red, smooth, hard, shining. The up-country carpenters apply the name 'Mihiriya' to this, but it is very unlike the wood properly so called (*Dichopsis grandis*).

2. **G. speciosa,** *Choisy, Mem. Tern.* p. 52 (1855).
Carria speciosa*, Gardn. Calc. Journ. Nat. Hist. vii. 7. Thw. Enum 40. C. P. 2043.
Fl. B. Ind. i. 292.

A tree, 40–50 ft., bark smooth and shining, young twigs glabrous; l. 3–6 in., sessile or nearly so, oval or oblong-oval, very obtuse, often emarginate, entire, margin often revolute, coriaceous, glabrous, purplish and veinless beneath; fl. very large, 3–4 in. diam., solitary, on short, thick, axillary ped., bearing a few bracts; sep. 3–5, broad-oval, glabrous, ciliate; pet. broadly obcordate, 2 in., connate at base, silky outside; stam. coherent into 5 bundles, adherent to base of pet. and ⅓ as long; ov. hairy, style as long as stam.; capsule surrounded

* Dedicated to the Hon. (afterwards Sir) W. O. Carr, F.L.S., Senior Puisne Judge of Ceylon in 1846.

at base by persistent sep., 1¾–2 in., ovoid-oblong, pointed, 5-angled, smooth ; seeds with flat cotyledons.

Montane zone ; very rare. Gregarious in the forest above Rambodde at about 4000 ft., July 1845 (Gardner). Galagama ; Ambagamuwa (Thwaites); Corfu Estate, Maskeliya, 1889. Fl. March–September ; deep crimson.

I fear that the extensive clearings in the hills have exterminated this fine species in most places.

Camellia Thea, Link, the Tea plant, is figured in J. W. Bennett's 'Ceylon and its Capabilities,' p. 276, and said to have been found wild at Batticaloa in 1826. An error is undoubted, but as the Tea plant was in cultivation in Ceylon before 1824 (being included in Moon Cat. p. 42, published in that year), it is probable that the specimen figured was a cultivated one. In the text Bennett has confused true Tea with the leaves of the 'Wild Tea' of the East coast, which is *Cassia auriculata*. (See also under *Eurya* and *Elæodendron glaucum*).

XXI.—DIPTEROCARPACEÆ.

TREES with resinous wood ; l. alternate, simple, entire, stipulate ; fl. regular, bisexual ; sep. 5, very slightly connate at base or rarely combined into a cal.-tube, persistent, usually much enlarged in fruit ; pet. 5, usually connate at base, contorted ; stam. 15 (rarely 10 or 5) or indefinite, fil. very short, distinct or connate at base, connective often prolonged ; ov. free, or very nearly so, 3-celled (rarely 2-celled), with 2 pendulous ovules in each cell, style simple ; fruit a 1-seeded, usually indehiscent nut, often closely surrounded by, or enclosed in, but not adherent to, the persistent cal.-tube or the usually much enlarged and often winged sep. ; seed large, cotyledons usually unequal, often divided, or lobed, or folded and convolute, no endosperm.

Sep. combined below into a distinct calyx-tube . . . . 1. DIPTEROCARPUS.
Sep. very slightly connate at base.
 Fruit-sep. greatly enlarged, all with a thickened base, and some terminating in long wings.
  Stam. 20 or more . . . . 2. SHOREA.
  Stam. 15.
   Three fruit-sep. with wings. . . . 3. DOONA.
   Two fruit-sep. with wings . . . . 4. HOPEA.

Fruit-sep. much enlarged, but without a thickened base or distinct wings, erect or spreading.
Sep. unequally enlarged, wing-like, erect . 5. SUNAPTEA.
Sep. equally enlarged, spreading.
Sep. loosely or not at all imbricate . . 6. VATICA.
Sep. strongly imbricate . . . . . 7. BALANOCARPUS.
Fruit-sep. slightly and equally enlarged, reflexed.
Stam. indefinite . . . . 8. VATERIA.
Stam. 15; ov. 3-celled . . . . . 9. STEMONOPORUS.
Stam. 5; ov. 2-celled . . . . . 10. MONOPORANDRA.

The limits of the genera in this Order are very uncertain, and the present arrangement will be found to differ in some respects from that given in *Fl. B. Ind.* Dr. Burck, of Java, has recently (*Ann. Jard. Buitenzorg*, vi. 145) proposed new limitations, based on the anatomical relations of the secretory channels in the internodes and petioles; but, whether these be truly natural or not, they are not available for use in the field, and I have here kept to the more easily recognised characters afforded by the fruiting calyx and stamens and the structure of the seed.

The Family is confined to the Eastern Tropics, and is especially characteristic of the Malayan flora. All our species are endemic, except *Vatica Roxburghiana.* Very few species occur in Peninsular India.

Our knowledge of the Ceylon species is imperfect. They are for the most part tall trees, very local and inhabiting dense wet forests; many appear to flower only at long intervals; and fruit, upon which the nomenclature so much depends, is difficult to obtain. It is probable that there are several more species than those here described, but leaves alone afford no characters for determining even their genera; the native names, too, are often very vaguely applied, and give little help.

Of our forty-six species all are confined to the moist region, with the exception of *Vatica obscura*, which is found only in the dry country, and *Stemonoporus acuminatus*, *Hopea* (?) *cordifolia*, and *Balanocarpus zeylanicus*, which inhabit what may be called the intermediate region. Only about six species reach up into the lower montane zone, of which *Doona Gardneri*, *Stemonoporus Gardneri*, and *S. affinis*, extend the highest.

In the descriptions of the leaves the number of lat. veins given is that on each side of the midrib. On young shoots the leaves are often of considerably larger dimensions than those here given.

1. **DIPTEROCARPUS,** *Gaertn. f.*

Large trees; l. with very large membranous deciduous stip.; fl. large, in axillary racemes or spikes; sep. 5, combined into a lobed cal., 2 (rarely 3) lobes much longer than others, greatly enlarged in fruit; pet. 5, usually connate at base; stam. indef., anth. linear, long-acuminate; ov. 3-celled; fruit indehiscent, enclosed in but not adherent to the tube of the enlarged persistent cal., of which two of the lobes have become long wings; pericarp thin; seed large;

cotyledons nearly equal, very thick, partially fused, much convoluted, ruminated on section.—Sp. about 50; 17 in *Fl. B. Ind.*

Tube of fruit-calyx without ribs or wings . . . 1. D. HISPIDUS.
Tube bluntly 5-ribbed . . . . 2. D. ZEYLANICUS.
Tube 5-winged.
  Wings undulated . . . . 3. D. SCABRIDUS.
  Wings not undulated.
    Fl. pedicelled . . . . 4. D. GLANDULOSUS.
    Fl. sessile . . . . 5. D. INSIGNIS.

1. **D. hispidus,** *Thw. Enum.* 33 (1858). **Bu-hora,** *S.*
D. oblongifolius, Thw. Enum. 33 (non Bl.); *D. oblongus*, A. DC. in DC. Prod. xvi. 608. C. P. 2903, 3405.
Fl. B. Ind. i. 296.

A very large tree; younger parts very densely covered with tufts of long fulvous hair; l. very large, 6–12 in., broadly oblong-oval, rounded or subcordate at base, shortly acuminate, sinuate, glabrous, except on midrib above, thickly set with tufts of soft hair on veins beneath, lat. veins 13–16 on each side, petioles 1–2 in. with tufts of long fulvous hair, stip. 6 in., glabrous outside, stellate-hairy within; fl. large, 2 in. diam., few in the raceme, ped. hairy; cal.-tube $\frac{1}{2}$ in., obscure, 5-ribbed, densely stellate-pubescent; pet. densely stellate-hairy outside; fruit-cal. 7–8 in., tube spherical, without ribs, at first stellate-pubescent, afterwards glabrous, wings very obtuse, strongly reticulated, not obviously 3-veined.

Moist low country; rare. Neighbourhood of Ratnapura only; Palabadulla. Fl. April.
Endemic.
The wood yields an aromatic reddish gum-resin.

2. **D. zeylanicus,** *Thw. Enum.* 33 (1858). **Hora,** *S.* (PLATE X.)
D. turbinatus, Moon Cat. 42 (non Gaertn. f.). C. P. 1921, 2398.
Fl. B. Ind. i. 297.

A very tall tree, with straight, erect trunk, branching mostly near the top, bark flaking off in small pieces, twigs marked with scars of fallen leaves and stip., young parts densely pubescent or silky; l. large, 5–8 in., broadly oval, rounded at base, suddenly acute, obscurely crenate-serrate, glabrous (except when young on the veins beneath), lat. veins 14–18, petioles $1\frac{1}{2}$–2 in., pulverulent when young, stip. 5 in. long, oblong, acute, thick, pink, pubescent inside, caducous; fl. $1\frac{1}{2}$ in. diam., racemes double, drooping, ped. $\frac{1}{4}$–$\frac{1}{2}$ in., at first stellate-puberulous; cal.-tube $\frac{1}{4}$–$\frac{3}{5}$ in., campanulate, glabrous, stellate-pubescent; pet. about 1 in., oblong, obtuse, recurved at end; stam. with an apiculus nearly as long as

anth.; ov. pubescent; fruit.-cal. 7 in., tube 1¼ in., bluntly 5-ribbed down part or whole length, urceolate, wings strongly 3-veined, reticulated, smaller lobes about 1 in., broad-oval, very obtuse, nut about 1 in., ovoid-conical, blunt, finely silky.

Moist low country and extending into lower montane zone; common. Fl. February. Pet. purplish-red with a yellow border.
Endemic.
Affords a greenish-grey semi-liquid gum-resin.
Wood moderately hard, rather light, red; not durable, but great lengths can be obtained, which makes it valuable for scaffolding and other temporary purposes.
The ribbing of the fruiting cal.-tube is often very slight, but the fruit can be distinguished from that of *D. hispidus* by the different venation of the wings.

[*D. turbinatus*, Gaertn. f., has been said to be cultivated in Ceylon, but erroneously so (see Thw. Enum. p. 402); C. P. 2398, above quoted, was at first thought by Thwaites (l. c. p. 34) to be this species. It affords the Gurjun oil of medicine, and is a native of the Malay Peninsula.]

3. **D. scabridus,** *Thw. Enum.* 34 (1858).
C. P. 2692, 2590 (in part).
Fl. B. Ind. i. 298.

A large tree; young twigs with copious adpressed hairs; l. 6–9 in., oblong-lanceolate, rounded or acute at base, shortly acuminate, acute, nearly entire, glabrous above, ciliate, veins hairy beneath, lat. veins 12–18, petioles ¾ in. or more, densely adpressed-hairy; fl. not seen; fr.-cal. 4–5 in., tube oblong-ovoid, with 5 strong marked, broad, undulated, vertical wings, generally reaching to the base, slightly stellate-pubescent; lobe-wings 3–4 in., somewhat undulated mottled, smaller lobes oblong-rotundate, much undulated and crumpled.

Moist low country; very rare. Near Ratnapura. Fl. not collected.
Endemic.

4. **D. glandulosus,** *Thw. Enum.* 34 (1858). **Dorana,** *S.*
C. P. 2590.
Fl. B. Ind. i. 297.

A large tree; young parts hairy; l. 3–5 in., oblong-oval, rounded at base, shortly acuminate, entire, glabrous above, except on midrib, finely stellate-pubescent and glandular beneath, lat. veins 11–13, petioles ¾–1 in., stellate-hairy, stip. 1½ in., with tufts of long stellate hair outside; fl. 1½ in. diam., few, in short axillary racemes, ped. stellate-hairy; cal. stellate-pubescent, with a narrow campanulate tube, prominently and bluntly 5-winged; pet. stellate-pubescent outside; fruit-cal. 4–4½ in., nearly glabrous, tube globular-ovoid, with 5 strong narrow vertical wings reaching nearly to the base; lobe-wings (often 3) 3½–4 in. long.

Moist low country; rare. Ambagamuwa; near Ratnapura. Fl. March, April; pale yellow with a pink tinge.

Endemic.

The blackish resinous oil, 'Dorana tel,' is a good substitute for Gurjun Balsam, and is used in the Leper Hospital at Colombo.

5. **D. insignis,** *Thw. Enum.* 34 (1858).
C. P. 3406.
Fl. B. Ind. i. 298.

A large tree, twigs woolly-pubescent; l. 3½–5 in., oval, rounded or acute at base, shortly and bluntly acuminate, entire, glabrous above, hairy on veins beneath, lat. veins 10–12, petioles ¾ in., pubescent; fl. 2½ in. diam., sessile, few (1–3), distant, on short, drooping, axillary spikes; cal. glabrous, tube oblong, with 5 very wide undulated wings reaching to the base, enlarged lobes as long as tube, others very short truncate; pet. oval-oblong broad, stellate-pubescent outside; fruit-cal. 4–4½ in., glabrous, tube ovoid, with 5 straight not undulated wings ¼ in. wide.

Moist low country; rare. Near Ratnapura; Hewesse, Pasdun Korale. Fl. April; purplish-yellow.

Endemic.

2. SHOREA,* *Roxb.*

Large trees; l. with small deciduous, or large coriaceous, persistent stip.; fl. small, in axillary panicles; sep. 5, distinct; pet. 5; stam. numerous, connective cuspidate; ov. 3-celled; nut closely surrounded by the somewhat cupped dilated bases of enlarged winged sep., 3 of which are much longer than the other two, wings 7–11 veined; cotyledons unequal, plane-convex, each deeply bilobed.—Sp. about 40; 19 in *Fl. B. Ind.*

Stipules inconspicuous, soon falling.
  Lateral veins of leaves 11–16 on each side.
    Leaves 4–8 ins. . . . . . . 1. S. OBLONGIFOLIA.
    Leaves less than 4 ins.
      Tertiary leaf-veins sub-parallel . . 2. S. DYERII.
      „ reticulated . . . . . 3. S. RETICULATA.
  Lateral veins 6–8 on each side . . . 4. S. LISSOPHYLLA.
Stipules large, persistent . . . . . . 5. S. STIPULARIS.

1. **S. oblongifolia,** *Thw. Enum.* 36 (1858).
C. P. 3005.
Fl. B. Ind. i. 307.

A large tree; young shoots finely pubescent; l. 4–8 in., ovate-oblong, more or less cordate at base, shortly acuminate, glabrous on both sides, shining above, finely reticulate and often paler beneath, lat. veins about 16, petioles ¾ in., puberu-

* In honour of Sir John Shore, afterwards Lord Teignmouth, Governor-General of Bengal, 1793–8.

lous ; fl. small, nearly sessile on one side of the spreading or drooping branches of long lax axillary and apparently terminal panicles ; sep. hood-oval, obtuse, densely pubescent ; pet. $\frac{1}{3}$ in., erect, linear-oblong, the margin revolute, silky outside; stam. about 60, with three terminal bristles; fruit-sep. pubescent, the larger $2\frac{1}{2}$–$2\frac{3}{4}$ in., obovate-oblong, the shorter 2 in., oblong-linear, nut $\frac{3}{4}$ in., pointed, finely pubescent.

Moist low country; rather common. Eknaligoda; Hiniduma; Singhe Raja; Moragala; Avisawella; Labugama. Fl. April–June; yellow with pink base.

Endemic. Very near *S. Tumbugaia*, Roxb., of S. India.

Liable to produce the curious hop-like galls noticed under *Doona cordifolia.*

Called 'Dun' in W. Prov.

2. **S. Dyerii,** *Thw. in Trim. Journ. Bot.* xxiii. 204 (1885).
C. P. 4010.

Tree, young parts finely pubescent ; l. (upper) $2\frac{1}{2}$–3 in., narrowly ovate-lanceolate, rounded at base, gradually tapering to shortly acuminate, obtuse or subacute apex, paler beneath, lat. veins 12–14, petioles $\frac{1}{2}$ in., slender, puberulous ; fl. numerous, sessile, rather closely placed along upper side of short divaricate branches of lax spreading axillary and terminal panicles ; sep. broad-oval, subacute, densely pubescent; pet. oblong-oval, flat, spreading, $\frac{1}{6}$ in., densely silky outside ; stam. about 60, anth. with a strongly ciliated apiculus half as long as themselves ; style very short ; fruit not seen.

'South of the Island' (Thwaites). I have no further information about this species, which has not been again collected. Fl. red.

Endemic.

The material for this species is imperfect.

3. **S. reticulata,** *Thw. in Fl. B. Ind.* i. 307 (1874).
C. P. 3884.

A tree, young parts glabrous ; l. 3–4 in., oblong-lanceolate, attenuate, acute, glabrous, shining above, paler beneath, lat. veins 11, curved, not very prominent, tertiary veins reticulate, petioles $\frac{1}{4}$ in., channelled above ; fl. not seen ; fruit-sep. pubescent, the larger 2–$2\frac{1}{4}$ in., the smaller 1–$1\frac{1}{4}$ in., wings linear 7–9 veined.

Only known from the C. P. specimen, collected in Morowak Korale, Sept. 1865.

4. **S. lissophylla,** *Thw. Enum.* 402 (1858).
C. P. 3407.
Fl. B. Ind. i. 307.

A large tree, with blackish bark, young shoots glabrous ; l. 3–5 in., broadly ovate, rounded or subcadate at base, abruptly and shortly acuminate, obtuse, coriaceous, smooth

and shining on both sides, paler beneath, lat. veins 6–8, distant, much curved, petioles ½ in., glabrous, thick; fl. on very short ped., nodding, arranged in short branches of lax elongated axillary panicles shorter than l.; sep. broadly ovate, acute, pubescent; pet. nearly ½ in., linear, acute, spreading, pubescent outside; stam. about 35, anth. bearded; fruit not seen.

Moist low country; rather rare. Singhe Raja Forest; Maddegatte, S. Prov.; Nillowe, near Akuressa, S. Prov. Fl. April.

Endemic.

Called 'Malmora' in S. Prov.

5. **S. stipularis,** *Thw. Enum.* 36 (1858).
C. P. 3408.
Fl. B. Ind. i. 307.

A large tree, young shoots glabrous; l. 5–7 in. or more, broadly oblong-oval or rotundate, rounded at base, suddenly acuminate or caudate, obtuse, glabrous on both sides, coriaceous, midrib very prominent beneath, channelled above, lat. veins 16–18, petioles 1½–3 in., thick and fleshy, stip. large, 1 in., erect, oval, obtuse, with numerous parallel veins, very persistent; fl. not seen; fruit-sep. glabrous, the larger 5 in., the shorter 2½ in., base very thick, wings very obtuse, with 9–11 veins.

Var. β. **minor,** *Thw. in Trim. Journ. Bot.* xxiii. 205. C. P. 4024 and 3987 (part).

Leaves much smaller, 3 in. long, the apex strongly twisted, very finely but densely pubescent beneath, stip. acute, pubescent; fl. not seen; fruit as in the type.

Moist low country up to 3000 ft.; rather rare. Karawita-Kanda; Singhe Raja Forest; Morowak Korale. Var. β. Morowak Korale. Fl. not seen.

Endemic.

There are often produced in the leaf-axils hard pale-green finely lobulated and rounded masses viscous on the surface and formed of crowded coral-like abortive branches. These may be of similar character to those on *Hopea Wightiana*, Wall. as figured in Wight, Ill. t. 37. Var. β. may be a separate species.

S. brevipetiolaris, Thw. in Trim. Cat. Ceyl. Pl. 9, is not a member of this genus, but perhaps referable to *Balanocarpus* (q. v.).

3. DOONA, *Thw.*

Large trees; l. conduplicate, obtusely acuminate, glabrous, with small deciduous stip.; fl. small, with articulated ped., in axillary and terminal panicles; sep. 5, 3 outer much larger; pet. 5, slightly connate at base, stam. 15, fil. usually connate at base, anth.-cells apiculate, connective prolonged

into a conspicuous clavate appendage; ov. as in *Shorea;* three of the enlarged fruiting sep. with long wings, the other 2 inconspicuous, thickened bases very closely adpressed to nut, resinous, wings obscurely veined; cotyledons much plicate and convoluted, with the testa following the convolutions.—Endemic Genus.*

Caryolobis, Gaertner, should strictly be the name of this genus, as there can be no doubt that the *C. indica* described and figured by him (Fruct. i. 215 and t. 45 f. 4) is one of our species, probably *D. trapezifolia.* He gives the Sinhalese name, 'Beralie,' for it.

Pierre in *Fl. For. Cochinch.* describes the embryo as surrounded by an abundant and sometimes ruminate endosperm; I have not been able to corroborate this in the fresh specimens I have examined.

It is a difficult matter to discriminate the species of this genus; the fl. and fr., so far as they are known, present great similarity, and in the following key I have been forced to attempt to define them by their leaves. It is probable that there are yet other species in Ceylon.

L. under 6 in.
  Lat. veins more than 10 (except sometimes No. 7).
    Lat. veins inconspicuous.
      L. acute at base . . . . . . 1. D. ZEYLANICA.
      L. rounded at base
        Fruit-cal. $1\frac{1}{4}$ in. . . . . . . 2. D. AFFINIS.
        Fruit-cal. $1\frac{3}{4}$–2 in. . . . . . 3. D. GARDNERI.
    Lat. veins conspicuous.
      Conspicuous both above and beneath.
        Fl. laxly arranged.
          L. over 3 in., lat veins 10–12 . . 4. D. NERVOSA.
          L. under 3 in., lat. veins about 20 . 5. D. TRAPEZIFOLIA.
        Fl. crowded . . . . . . 6. D. CONGESTIFLORA.
      Conspicuous beneath only . . . 7. D. CORDIFOLIA.
  Lat. veins 10 or less.
    Lat. veins all parallel.
      L. ovate or ovate-oval . . . . 8. D. OVALIFOLIA.
      L. lanceolate-oblong . . . . 9. D. OBLONGA.
    Lower lat. veins ascending . . . 10. D. VENULOSA.
L. over 6 in. . . . . 11. D. MACROPHYLLA.

1. **D. zeylanica,** *Thw. in Kew Journ. Bot.* iv. 7 (1852) **Dun,** *S.* Thw. Enum. 34. C. P. 2423.
Fl. B. Ind. i. 311. Kew Journ. Bot. iii. t. 12. Bedd. Fl. Sylv. t. 97.

A large tree, reaching 60 or more ft., trunk erect, much branched at top with horizontal branches, bark rough, cinnamon-brown, twigs glabrous, drooping; l. 2–3 in., lanceolate, acute at base, attenuate-caudate, glabrous and shining, lat.

* Burck, on anatomical grounds, refers to *Doona* 4 Malayan species (including *Hopea odorata*, Roxb., and *Petalandra micrantha*, Hassk.) but the union does not appear to me very natural.

veins numerous, slender, inconspicuous, pellucid, with minute reticulations between, margins at base usually rigidly revolute, giving a rhomboidal form to the leaf, petiole ½ in., slender, curved ; fl. ½ in. diam., panicles few-fld., lax, axillary and terminal, shorter than or scarcely exceeding l., ped. ¼ in., glabrous ; sep. obtuse, glabrous ; pet. oval, obtuse, entire or notched at tip, minutely silky outside ; appendage as long as anth. ; ov. glabrous ; enlarged fruit-sep. 1¼ in., wings obovate-oblong, obtuse, twisted, with about 10 inconspicuous veins ; nut quite concealed by enlarged base of sep., sharply pointed.

Lower montane zone and upper zone of moist low country, 1000–4000 ft.; common and formerly much more so. Fl. March–May; pale rose colour or quite white. The enlarged sep., when half grown, a brilliant crimson.

Endemic.

A characteristic tree of the lower hill-forests, now much cleared. The mode of branching horizontally chiefly at the top, and the preference of the tree for the crests of hills, which causes their outlines to stand out against the sky, gives the tree at a distance much the appearance of the Stone Pine of Italy.

The timber is light, moderately hard, pale greyish-brown, durable, and greatly in request for shingles, whence the tree is often called 'shingle-tree.' It burns with a bright flame. An excellent colourless Dammar-like resin exudes from the trunk.

2. **D. affinis,** *Thw. Enum.* 35 (1858).
C. P. 3409.
Fl. B. Ind. i. 311.

A large tree, twigs glabrous ; l. 2–2½ in., lanceolate, rounded at base, caudate-acuminate, rather thick, drooping, lat. veins numerous, inconspicuous, much arched, midrib channelled above, margin revolute at base and slightly re-curved throughout ; fl. drooping, articulated on rather long ped., in axillary and terminal panicles about as long as l., nearly ½ in. diam. ; sep. oblong, obtuse, very resinous ; pet. silky on back ; appendage about ½ length of anth. ; enlarged fruit-sep. rather less than 1¼ in., wings broadly oblong-spathulate.

Moist low country ; very rare. Singhe Raja Forest, April 1855 ; Kokawita, Kukul Korale, 1892 (Lewis).

Endemic. Fl. March ; creamy-white.

More material is required for the satisfactory determination of this species.

C. P. 3712 was accidentally referred to this by Thwaites (Enum. 402), and the description in Fl. B. Ind. is taken from that C. P. number (which is from Lihinigala, Hewesse, collected in March, 1861). The specimens are in young bud, and differ from *D. affinis* in the venation of the leaves, which is intermediate between that of *D. venulosa*, Thw. and *D. oblonga*, to one of which species they belong.

3. **D. Gardneri,** *Thw. Enum.* 35 (1858).
C. P. 1919.
Fl. B. Ind. i. 312. Bedd. Fl. Sylv. t. 98.

A large tree, bark thick, smooth, fibrous, young parts glabrous ; l. 2½–3½ in., ovate-oval, rounded at base, margin revolute at base, thick, lat. veins about 13, rather inconspicuous, petioles ½–¾ in., slender, deeply channelled ; fl. ⅝ in., on very short, nodding ped., in axillary and terminal panicles ; sep. oval, obtuse, glabrous and shining ; pet. rotundate, concave, very hairy outside ; enlarged fruit-sep. 1¾–2 in., wings oblong-linear.

Lower montane zone ; rather rare. Hewahette ; Dickoya ; Raxawa (Gardner) ; Ambagamuwa. Formerly more common. The only hill species of *Doona.* Fl. Jan.–April ; pale pink.

Endemic.

Wood hard, even-grained, durable, reddish-brown ; called 'Red Doon' by the sawyers in the hill-country, and used for sleepers on the Haputale railway.

4. **D. nervosa,** *Thw. Enum.* 35 (1858). **Kotikan-beraliya,** *S.*
C. P. 3410.
Fl. B. Ind. i. 311.

A large tree, young parts glabrous ; l. 3–5 in., ovate-lanceolate, rounded or slightly subpeltate at base, lat. veins 10–12, curved, fine, with the reticulations prominent beneath as well as above, petioles ¼–⅜ in. ; fl. ⅝ in. diam., nodding, in few-flowered axillary panicles shorter than l., ped. thick ; sep. glabrous ; pet. silky outside ; enlarged fruit-sep. 1¼ in., wings narrowly oblong-spathulate, twisted, nut sharp-pointed, considerably exceeding the thickened bases of sep.

Moist low country ; rare. Eknaligoda and Palabadulla, Kuruwita Korale ; Hewesse ; Pasdun Korale ; Udugama, S. Prov. (Capt. Walker) ; Waddagalle, Kukul Korale (Lewis). Fl. March, April.

Endemic.

The curious hop-like galls are also found on this species.

I am not sure that the specimens from the S. Prov. should be referred to this species.

5. **D. trapezifolia,** *Thw. Enum.* 35 (1858). **Yakahalu,** *S.*
C. P. 3341.
Fl. B. Ind. i. 311.

A large tree, young parts puberulous ; l. 2½–3 in., oblong-oval or slightly rhomboid, acute or rounded at base, shortly caudate-acuminate, lat. veins numerous (about 20), fine, and with the connecting veinlets more conspicuous above than beneath ; fl. ½ in. diam., in short axillary panicles, ped. slender, puberulous ; enlarged fruit-sep. ½–2 in., wings linear-oblong, nut ¾ in., longer than thickened bases of sep., sharply pointed.

Moist low country up to 2500 ft. or more; rather common. Near Navalapitiya; Ambagamuwa; Singhe Raja Forest; Morowak Korale (Capt. Walker); Pelmadulla (F. Lewis). Fl. April.

Endemic.

Easily recognised by the fine small raised reticulation of the upper surface of the leaf.

The name 'Yakahalu' is applied, with different prefixes, to several other species of this family in South of Ceylon. This is called 'Beraliya-Yakahalu' in S. Prov. There appear to be several varieties recognised by the natives, and possibly more than one species are confounded here. The fruit of the Ambagamuwa tree (2200 ft.) is shorter and has smaller fruit-sep. than as above described.

The fruits are dried, pounded, and made into flour for food, and are largely consumed when they can be got, but are said to be produced only every seventh year. It was abundant in the S. Prov. in 1887.

6. **D. congestiflora,** *Thw. Enum.* 35 (1858). **Tiniya,** *S.* [PLATE XI.]
C. P. 3411.
Fl. B. Ind. i. 312.

A very large tree, young parts velvety-pubescent; l. $3\frac{1}{2}$–$4\frac{1}{2}$ in., oval or ovate-oval, rounded at base, rather thick, shortly acuminate, lat. veins 10–12, curved, more conspicuous above than beneath, petioles $\frac{1}{2}$ in., rugose; fl. $\frac{1}{2}$ in. diam., very shortly pedicellate, crowded at the ends of branches of short, stout, pubescent, axillary and terminal panicles; sep. glabrous, oblong, obtuse; pet. truncate, notched; enlarged fruit-sep. $1\frac{3}{4}$–2 in., often unequal, wings oblong-linear, nut $\frac{3}{4}$ in., much exceeding the thickened bases of sep.

Moist low country; rare. Hiniduma; Hewesse; Singhe Raja; Bambarabotuwa; Gilimale, Sabaragamuwa (F. Lewis). Fl. August, Sept.; pale pink.

Endemic.

Wood pale reddish-brown, rather light, moderately hard.

7. **D. cordifolia,** *Thw. Enum.* 35 (1858). **Beraliya,** *S.*
C. P. 3340.
Fl. B. Ind. i. 312.

A large tree, bark smooth, coming off in large flakes, young parts slightly pubescent; l. 4–6 in., ovate or oblong-oval, rounded or slightly subcordate at base, tapering to long caudate-acuminate apex, lat. veins about 10, often less, curved, conspicuous beneath only, petioles $\frac{1}{3}$–$\frac{1}{2}$ in., fl. and ripe fruit not seen.

Moist low country; rather rare. Sabaragamuwa; Lihinigala, Hewesse, abundant; Lunugala; Uva (?); near Matara (Walker). Fl. Feb.; said to flower every third year.

Endemic.

Only seen by me in very young fruit in 1887.

Hop-like globular leafy galls are abundantly produced on this species,

even on seedling plants; they are composed of small undeveloped deflexed linear leaves with tubular bases.

A very good varnish-resin is afforded by this tree.

The name 'Yakahalu' seems to be applied to this in the S. Prov. The seeds are eaten after having been roasted.

8. **D. ovalifolia,** *Thw. Enum.* 402 (1864). **Pini-beraliya,** *S.*
C. P. 3711.
Fl. B. Ind. i. 312.

A large tree, young parts glabrous; l. usually small, 2–3 in., sometimes 4–4½ in., ovate or ovate-oval, rounded at base, attenuate to long caudate apex, paler beneath, lat. veins 8–9, prominent beneath, petioles ⅓–½ in., slender, channelled; fl. on slender, drooping ped., in few-fld. axillary racemes or panicles shorter than the l.; sep. glabrous; pet. pilose outside; enlarged fruit-sep. a little over 1 in., wings oval-spathulate.

Moist low country; rare. Sabaragamuwa (Thwaites); Lihinigala, Hewesse; Timbera, Kukul Korale (Lewis). Fl. April.

Endemic.

Affords a good white resin.

Similar leaf-galls to those mentioned under *D. cordifolia* are produced in this tree also.

The usual form is easily known by its small long-tailed leaves and small broad fruit-sepals, but there is a larger-leafed tree which in the absence of fl. and fr. is provisionally placed under this species.

An allied species, unfortunately in leaf only, has been sent me by Mr. Broun from Ingiriya Forest, near Labugama. It has the small leaves broadly ovate, much less caudate, with 7–10 lateral curved veins very conspicuously marked on the under surface, which is also very pale. The local name was 'Yakahalu.'

9. **D. oblonga,** *Thw. in Trim. Journ. Bot.* xxiii. 206 (1885).
C. P. 3986, 3712 (?).

A tree, young parts pubescent; l. 3½–4½ in., lanceolate-oblong, rounded at base, coriaceous, with a recurved margin, lat. veins 8–11, distinct, curved, petioles ½ in.; fl. not seen; enlarged fruit-sep. 1¼–1½ in., wings oblong-spathulate, thick, nut ½ in.

Only known from the C. P. specimens which are without locality.

Mr. Broun, Conservator of Forests, sends leaves which may be this species from Kaniliya Forest, Hiniduma Pattu (where it is called 'Beraliya').

C. P. 3712 is doubtfully referable to this (see under *D. affinis*).

10. **D.** (?) **venulosa,** *Thw. Enum.* 402 (1864).
C. P. 3675.
Fl. B. Ind. i. 313.

A large tree, bark of smaller branches black, young parts glabrous; l. 2½–3¼ in., oval or ovate-oval, rounded at base,

suddenly acuminate, lat. veins 6–8, the lower very oblique, ascending, tertiary connecting veinlets very prominent on upper surface ; fl. and fr. not seen.

Only known from the C. P. specimens, which consist of leaves only. They are localised ' Low Country, Sept. 1860.'

These leaves may not belong to *Doona* at all, but the prominent reticulation on the upper surface is not unlike that of *D. trapezifolia.*

11. **D. macrophylla,** *Thw. Enum.* 402 (1864). **Honda-beraliya,** *S.*
C. P. 3713.*
Fl. B. Ind. i. 312.

A large tree, young parts glabrous ; l. large, 6–8 in., lanceolate-oblong, rounded at base, suddenly and shortly acuminate, thick, lat. veins 13–20, very prominent beneath, midrib channelled above, petioles $\frac{1}{2}$–1 in. ; fl. $\frac{3}{4}$ in., on short stout ped. ; sep. very obtuse, glabrous, resinous ; pet. oblong, pubescent outside ; enlarged fruit-sep. 2–2$\frac{1}{4}$ in., wings oblong-oval, broad.

Moist low country ; rare. Hiniduma Pattu ; Kukul Korale ; Hewesse ; Kumbala and Kaniliya Forests, S. Prov. ; Atakalan Korale (Lewis). Fl. Feb.

Endemic.

Called ' Napat Yakahalu ' in S. Prov. (Broun).

Affords a good yellowish-white resin. Timber good.

4. **HOPEA,**† *Roxb.*

Large trees ; fl. small, in axillary and terminal panicles ; sep. 5, equal ; pet. 5, slightly connate at base ; stam. 15, fil. slightly connate at base, connective with a very long apical bristle ; ov. as in *Shorea ;* nut as in *Shorea ;* 2 enlarged sep. with long wings, the other 3 inconspicuous, wings strongly veined ; cotyledons slightly unequal, each conduplicate (the larger including the smaller) bilobed, not plicate.—Sp. about 35 ; 11 in *Fl. B. Ind.*

Very near *Doona*, to which the two first species are referred by Burck, but the embryo very different.

Leaves under 5 in., rounded at base.
  Leaves bright brown beneath . . . . . 1. H. DISCOLOR.
  Leaves green beheath . . . . . 2. H. JUCUNDA.
Leaves 5–7 in., cordate at base . . . . 3. H (?) CORDIFOLIA.

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* Specimens have been also accidentally distributed under the C. P. numbers 3408 and 3987.

† Commemorates Dr. John Hope, Professor of Botany in the University of Edinburgh in 1761.

1. **H. discolor,** *Thw. Enum.* 36 (1858).
C. P. 3125, 2970.
Fl. B. Ind. i. 310.

A large tree, young parts finely scurfy; l. 2½–3 in., lanceolate-ovate, rounded at base, gradually tapering to acuminate or caudate obtuse apex, glabrous above, densely covered with bright brown scurf beneath, lat. veins conspicuous beneath, petiole ⅓ in., scurfy; fl. ½ in. diam., shortly pedicellate, secund on short spreading branches of axillary and terminal racemes which are shorter than the l.; sep. nearly equal, glabrous; pet. 3 or 4 times as long as sep., linear, hairy outside; stam. with terminal bristle nearly thrice length of anth.; enlarged fruit-sep. 2½ in., wings linear-spathulate, strongly 7-veined; nut sharp-pointed, much exceeding the thickened sep.-bases.

Moist low country; rather rare. Eknaligodde; Kuruwita Korale; Ambagamuwa; Kaniliya Forest, Hiniduma Pattu; Akuressa; Pelmadulla. Fl. April; pinkish-yellow, very sweet-scented.
Endemic.
Like many other Dipterocarps this is called 'Dun' in S. Prov.; it is also known as 'Malmora' there.

2. **H. jucunda,** *Thw. Enum.* 403 (1864). **Rat-beraliya,** *S.*
Thw. Enum. 403. C. P. 3709.
Fl. B. Ind. i. 310.

A large tree, twigs dark purplish-brown, glabrous; l. 3–5 in., oval or ovate-oval, rounded at base, abruptly caudate with tail ¾ in. long, glabrous, lat. veins 4, curved, conspicuous beneath, usually with pilose glands in their axils, petioles ¼ in.; fl. very shortly pedicellate, secund on short branches of lax, axillary and terminal panicles, which are as long as or longer than l.; sep. equal, very obtuse, glabrous; pet. thrice as long as sep., linear, silky outside; stam. with terminal bristle 4 times as long as anth.; fruit not seen.

Var. *β.* **modesta,** *A. DC. Prod.* xvi. 2. 633. C. P. 3710.

L. smaller, 1¾–2 in., branches of panicle very slender.

Moist low country forests; rather rare. Near Ratnapura; Hewesse; Hiniduma Pattu; Kukul Korale. Var. *β.* Lihinigala, Hewesse; Kukul Korale (Lewis). Fl. April.
Endemic. *H. malabarica*, Bedd. Ic. Fl. Ind. Or. t. 185 (*H. racophlœa*, Dyer, Fl. B. Ind.) of Malabar is very closely allied.
Var. *β.* is called at Hewesse by the same name, 'Pini-beraliya,' as *Doona ovalifolia*, along with which it grows and to which it has much resemblance.
Wood hard, smooth, yellowish-brown, rather heavy.

3. **H.** (?) **cordifolia,** *Trim.*
Vatica (?) *cordifolia*, Thw. Enum. 404. C. P. 3726.
Fl. B. Ind. i. 303.

A very large tree, bark thick, with deep, longitudinal fissures, nearly black, young parts softly pubescent; l. large, 5–7 in., ovate-oblong, strongly cordate at base, subacute, glabrous, shining above, lat. veins 5–7, oblique, conspicuous beneath, with glandular pits in 2 or 3 of their axils, petioles 1 in., rugose, stip. very small, subulate, caducous; fl. not seen; enlarged fruit-sep. 3½–4 in., wings oval-oblong, not tapering to base, 9-veined, nut ½ in., pointed; cotyledons deeply divided into 2 long lobes.

Intermediate region at 1500–2000 ft.; very rare. Along banks of streams at Tanamilwila and Telula, near the Wellaway River, in Atakalan Korale.

Endemic.

Leaves only were first collected in Sept. 1857, and were doubtfully referred by Thwaites to *Vatica*. Specimens (old and half-rotten) of the fruit have been sent to me (April, 1891) by Mr. Broun, and appear to indicate a *Hopea*, but flowers are still wanting, and the correct position of the tree cannot be determined at present.

It is called 'Mendora' where it grows.

Wood heavy, hard, yellow, smooth, and shining.

5. SUNAPTEA, *Griff.*

Trees; fl. in short axillary panicles, with large deciduous bracts; sep. and pet. 5; stam. 15, apiculate; fruit-sep. all enlarged, 2 much more so than the others, wing-like, erect, loosely surrounding the nut, the bases not thickened; cotyledons slightly unequal, bilobed.—Sp. about 10; 5 in *Fl. B. Ind.*

This is the section of *Vatica* called *Eu-Vatica* in Fl. B. Ind., but the fruiting cal. is quite unlike that of *Vatica*, and it cannot come under Linnæus' genus (see Trim. in Journ. Bot. xxiii. 204). *S. bantamensis* and *S. bancana* are figured by Burck (l. c. tt. 27 and 28), and *S. astrotricha*, *S. Dyeri*, and *S. faginea* by Pierre (Fl. For. Cochinch. tt. 240–242).

Leaves finely scabrous beneath . . . 1. S. SCABRIUSCULA
Leaves glabrous beneath. . . . . 2. S. (?) DISTICHA.

1. **S. scabriuscula,** *Trim. Syst. Cat. Ceyl. Pl.* 9 (1885). **Na-mendora,** *S.* [PLATE XII.]
Vateria (*Stemonoporus*) *scabriuscula*, Thw. Enum. 404. *Vatica scabriuscula*, A. DC. in DC. Prod. xvi. 2, 620. C. P. 3708, 3542.
Fl. B. Ind. i. 303 (*Vatica*).

A large tree, young shoots woolly-pubescent; l. 4–5 in., lanceolate-oblong, obtuse at base, shortly acuminate, obtuse, glabrous above, very finely scabrous and white with stellate

pubescence beneath, lat. veins very numerous, connected by loops near the margin, petiole $\frac{5}{8}$ in., rugose; fl. rather large, nearly sessile, in small axillary and terminal tomentose spicate panicles much shorter than the l., bracts large, $\frac{3}{8}$ in., acute, tomentose; sep. tomentose; nut spherical, $\frac{1}{4}$ in., very hairy, loosely surrounded by irregularly enlarged, erect, pubescent sep., the 2 largest 2 in., linear, obtuse, 3-veined, the others $\frac{3}{4}$–$1\frac{1}{2}$ in., lanceolate, acute.

Moist low country; rare. Hiniduma Pattu; Hewesse; Pasdun Korale; Lanegal Kanda, near Pelmadulla (F. Lewis). Fl. April.

Endemic.

I have not seen mature fls. The fruit was obtained at Hewesse in June. Wood heavy, hard, smooth, pale greyish-yellow.

The leaves of young trees attain very much larger dimensions than those above given.

Pierre (l. c. sub t. 237) erroneously refers this to *Stemonoporus*.

2. **S.** (?) **disticha,** *Trim. Syst. Cat. Ceyl. Pl.* 9 (1885).

Vateria (*Stemonoporus*) *disticha*, Thw. Enum. 404. *Vatica disticha*, A. DC. l. c. 620. C. P. 3707.

Fl. B. Ind. i. 303 (*Vatica* (?).

A large tree, young branches finely tomentose; l. 4–5 in., lanceolate-oblong, obtuse at base, attenuate, acute, glabrous, coriaceous, lat. veins about 11, conspicuous on both surfaces, petiole $\frac{1}{2}$ in., thick, rugose; fl. in short, erect, axillary panicles, bracts large, $\frac{1}{4}$–$\frac{1}{2}$ in., ovate, distichous, imbricate at first, tomentose, soon falling; fruit not seen.

Moist low country; very rare. Hinduma Pattu and Pasdun Korale (Thwaites). The C. P. specimens are from 'Lanegal Kanda, March, 1861,' and are in bud only.

Until further material is obtained the genus of this plant is quite uncertain. Pierre (l. c. sub t. 237) says it is a *Doona* near *D. nervosa*.

6. **VATICA,** *L.* (sect. *Isauxis*, Arn.).

Trees; fl. in axillary panicles; sep. 5, slightly connected below; pet. 5; stam. 15, apiculate; fruit-sep. all equally and considerably enlarged but not wing-like, spreading, not imbricate or enclosing the fruit; fruit with a thick pericarp marked with 3 grooves, indehiscent (or tardily 3-valved ?); cotyledons equal, thick, plano-convex, deeply divided into 2 equal lobes.—Sp. about 12; 6 in *Fl. B. Ind.*

Arnott's name *Isauxis* was given (Ann. Nat. Hist. iii. 155) to a section of *Vateria*, and was never used by him as a generic name.

Stemonoporus might perhaps be combined with this, as is done by A. DC.

Fruit nearly spherical . . . . 1. V. ROXBURGHIANA.
Fruit ovoid.
Lateral leaf-veins 4–6 on each side . . . 2. V. AFFINIS.
Lateral leaf-veins about 12 on each side . 3. V. OBSCURA.

1. **V. Roxburghiana,** *Bl. Mus. Bot.* ii. 331 (1852). **Mendora,** *S.*
Isauxis Roxburghiana, Thw. Enum. 37 and 404. C. P. 604.
Fl. B. Ind. i. 302. Bedd. Fl. Sylv. t. 95 (from a Ceylon specimen).

A moderate-sized tree, young parts finely pubescent; l. large, 5-10 in., oblong-oval, rounded at base, tapering to obtuse apex, coriaceous, glabrous, shining above, lat. veins 10–12, conspicuous beneath, petiole 1½ in., thickened above; fl. on very short, densely tomentose pedicels, arranged in erect panicles much shorter than the l.; sep. ovate, acute, densely and finely tomentose, combined below; pet. 4 times as long as sep., erect, oblong, obtuse, finely tomentose; anth. with short apiculus; stigma obscurely 3-lobed; fr. nearly spherical, ¾–1½ in., not apiculate, finely but densely pubescent, indehiscent, but marked with 3 vertical grooves, surrounded at base by enlarged sep., which are ½–¾ in., ovate, acute, 5-nerved, glabrous, pericarp very thick, fibrous-woody with radiate fibres; seed filling the fruit, embryo ¾ in. diam., cotyledons plane-convex, each almost completely divided into 2 equal halves.

Moist low country; rather common, especially near streams. Colombo; Kalutara; Hanwella. Fl. July.

Also in the west of India and Travancore.

V. chinensis, L. is a much older name, but the tree does not grow in China (see Journ. Bot. 1885, 204). This is the type of Linnæus' genus *Vatica*, and is well figured in J. E. Smith's Ic. Ined. t. 36. It does not appear whence Linnæus really obtained his specimens.

Wight, Ic. t. 26, probably represents this species, but is not characteristic.

The foresters call this the 'Swamp Mendora.' Wood hard, moderately heavy, smooth, even-grained, brown; very useful. A yellow transparent resin exudes abundantly from the stem.

The fruit has the appearance of an Euphorbiaceous one, but it does not appear to dehisce along the three grooves.

2. **V. affinis,** *Thw. Enum.* 404 (1864). **Hal-mendora,** *S.*
C. P. 3416.
Fl. B. Ind. i. 303.

A large tree, young parts glabrous; l. 4–6 in., ovate-lanceolate, rounded at base, tapering to subacute apex, glabrous, coriaceous, lat. veins 5–6, oblique, very prominent beneath, as are also the small, reticulate, connecting veins, petiole ¾–1 in., thickened above; fl. on short ped., in upright, nearly glabrous, axillary and terminal panicles shorter than

the l.; sep. lanceolate, very acute, finely tomentose; pet. thrice as long as sep., pubescent; fruit (? ripe) less than ½ in., ovoid, blunt, densely pubescent, loosely surrounded at base by the enlarged sep., which are nearly ½ in., broadly ovate, acute, thick, concave, glabrous, spreading.

Moist low country; rare. Kalutara; Hewesse, and elsewhere in the Pasdun Korale; Hiniduma Pattu. Fl. March.

Endemic.

Wood like *V. Roxburghiana*, but heavier and of darker colour.

3. **V. obscura,** *Trim. Journ. Bot.* xxiii. 203 (1885). **Tumpalai,** *T.* [PLATE XIII.]

Trim. in Journ. Bot. xxvii. 161.

A large tree, with rather smooth brown bark, young parts pubescent; l. 4–6 in., narrowly lanceolate-oblong, acute or obtuse at base, tapering to obtuse apex, glabrous, lat. veins about 12, not very prominent beneath, paler beneath and pellucid-punctate with transmitted light, petiole ½ in., slender; fl. rather large, nearly ¾ in. diam., on articulated ped. about as long as sep., arranged in many-fld., tomentose, erect, axillary panicles much shorter than the l.; sep. very small, oval-lanceolate, subacute, tomentose; pet. 5 or 6 times as long as sep., oblong, the base concave and stiffened, tomentose in bud; stam. very small, fil. shortly apiculate; fr. about 1 in., broadly ovoid, bluntly pointed, puberulous, glabrescent, surrounded at base by the enlarged sep., which are –½ in., ovate, acute, stiff and rigid, with the bases deflexed and the tops erect with their points against the base of the fruit, obscurely 3-veined, pericarp rather thick, brittle, with 3 faintly marked vertical furrows, cotyledons vertically divided almost to the base into equal halves.

Dry country; rare. Gregarious, forming forests in the Eastern Province inland from Batticaloa, at Polukanawa, Devilane, &c., and in the Province of Uva at Bintenne; locally abundant. Fl. June; pinkish-white.

Endemic.

Though long known to the timber dealers, this tree was not botanically determined till 1882, when Mr. Vincent, of the Indian Forest Service, collected and sent me specimens of the leaves and fls.

Wood hard, heavy, brown. Affords an odorous sticky gum-resin.

Mr. Nevill tells me that the Tamil name is a corruption of the Vedda 'Dummala,' resinous, and that the resin of the tree is used by those people for light. The Sinhalese wood-cutters call the tree 'Dun.'

In germination the pericarp splits down the 3 vertical furrows, and allows the radicle to escape at the apex.

7. **BALANOCARPUS,** *Bedd. in For. Man., Add.* 236 (1873?).

Trees; fl. in axillary panicles; sep. 5; pet. 5; stam. 15, anth. strongly apiculate; fruit with a thin pericarp, indehiscent, surrounded at base by a shallow cup formed of the equally enlarged very strongly imbricate sep.; cotyledons plane-convex, thick, very unequal, each divided nearly to the base into 2 equal lobes; radicle long, lying in a groove between the lobes of the larger cotyledon.—Sp. 3; the other 2 S. Indian.

The two species from the Tinnevelly Hills of S. India upon which Beddome founded this genus are figured in his Fl. Sylvat. tt. 329, 330. One (*B. utilis*, Bedd.) is the *Hopea longifolia* of Fl. B. Ind.; our species is nearer the other, *B. erosa*, Bedd.

Beddome describes the sep. in the Indian species as forming 'a hard woody 5-lobed cup;' this does not quite apply to our plant, which indeed doubtfully belongs to the genus.

B. (?) **zeylanicus,** *Trim. in Journ. Bot.* xxvii. 161 (1889). [PLATE XIV.]

Shorea brevipetiolaris, Thw. in Trim. Journ. Bot. xxiii. 205 (1885). C. P. 4008 (?).

A small tree, bark smooth, blackish, young shoots strongly pubescent or glabrous; l. 4–5 in., ovate or lanceolate-ovate, rounded or subcordate at base, tapering to acuminate obtuse apex, somewhat undulated, glabrous, lat. veins about 6, curved, prominent beneath, with small glandular pits in the axils, petiole $\frac{1}{4}$–$\frac{1}{3}$ in., thick, rugose, glabrous or densely pubescent; fl. shortly pedicellate, secund on short spreading branches of slender pubescent panicles, 2 or 3 of which come from a leaf-axil and are shorter than the l., buds nearly spherical; sep. ovate, obtuse, glabrous; fil. much dilated below, apiculus as long as anth.; fr. $\frac{3}{8}$–$\frac{1}{2}$ in., ovoid, acute, strongly apiculate, enlarged sep. $\frac{1}{8}$ in., broadly oval, very obtuse, hard, glabrous, much imbricated, forming a shallow, somewhat spreading cup, pericarp thin, brittle, glabrous, embryo green.

Intermediate region; very rare. Only known from summit of Doluwa Kanda (about 1000 ft.?) a few miles N. of Kurunegala, but probably occurs elsewhere. C. P. 4008 is without locality, and is probably different. Fl. May, June. I have not seen fully developed fls., only buds.
Endemic.

8. **VATERIA,** *L.*

Trees; fl. in panicles; sep. 5, slightly connected at base; pet. 5, distinct; stam. about 50, anth. linear, with each cell produced into a filiform tail, connective not apiculate; fruit

large, indehiscent, supported on the slightly enlarged, somewhat reflexed sep.; cotyledons very unequal, the larger deeply 2-fid.—Sp. 2, both in *Fl. B. Ind.*

V. acuminata, *Hayne Arzneik.* xi. 5 (1830), *non Thw.* **Hal.,** *S.* *Elæocarpus copalliferus*, Retz. Obs. iv. 27. *V. indica*, Bl. Mus. Bot. ii. 29 (non L.); Moon Cat. 42; Thw. Enum. 37. A. DC. l. c. 625. C. P. 1918.

Fl. B. Ind. i. 313. Gaertn. Fruct. iii. t. 189 (fruit). Bl. Mus. Bot. ii. t. 4. (*V. indica.*)

A large tree, with spreading branches and a round head, young shoots covered with brown, stellate hairs; l. large, 6–10 in., oblong or lanceolate-oblong, rounded or subcordate at base, very shortly acuminate, entire, coriaceous, glabrous and shining above, slightly hispid on veins beneath, midrib very thick, lat. veins 18–20, all very prominent beneath, petioles $1\frac{1}{4}$–$1\frac{1}{2}$ in., very thick, swollen at top, cylindrical, hairy; fl. large, 1 in. diam., on stout ped. as long as sep., in stout, ascending panicles from the ends of the branches below the terminal bud, bracts large, ovate, acute, deciduous, whole infl. shaggy with tufts of rufous hair; sep. oblong-oval, subacute, shaggy outside; pet. rotundate, subacute; anth. almost sessile, the cells linear, auriculate at base, prolonged into filiform hooked points; ov. densely silky; fr. large, 3–5 in. long, oblong-ovoid, somewhat pointed, rounded-truncate at base, where it is supported by the enlarged lanceolate sep., indehiscent, 3-grooved, rough, pale reddish-brown, pericarp thick, spongy-woody; embryo very large, cotyledons very unequal, the smaller one undivided, the larger deeply split into two nearly separate portions.

Moist low country, especially near streams, up to about 2000 ft.; common. Fl. April, May; cream-coloured, sweet-scented.

Endemic.

A very beautiful tree, often planted for ornament.

The stem exudes a clear yellowish (erroneously said to be 'green' in Fl. B. Ind.) resin abundantly, equal to the best dammar. The bark is much used for checking the fermentation of toddy, and many trees are killed by being stripped. Wood light, rather hard, yellowish-grey. The seeds are ground into meal and eaten.

Gaertner's figure of the fruit is very good, but represents a small specimen. Though the pericarp is indehiscent, it partially splits down the line of the grooves at the time of germination to allow the exit of the radicle.

Hermann seems to have known this, as Blume says there are specimens from him in the herbaria of J. Burman and Van Royen; but he did not clearly distinguish it from *Canarium zeylanicum.* There are specimens from Koenig in the Brit. Museum.

[*V. indica*, L. (V. malabarica, *Bl.*) does not occur in Ceylon. Yet Linnæus (see Fl. Zeyl. No. 204) partially based the species on a specimen in Hermann's Herbarium. This, however, cannot now be discovered there (see Journ. Linn. Soc. xxiv. 143). The species is figured, under the name *V. malabarica*, in Bedd. Fl. Sylv. t. 84; it affords the 'Piney varnish' or 'white Dammar' of S. India.]

9. **STEMONOPORUS**, *Thw.*

Trees; fl. in axillary panicles, racemes, or small clusters, or solitary; sep. 5; pet. 5; stam. 15, in 2 rows, 10 external, 5 internal, anth. short, with the outer valves longer than the inner, opening by a terminal, tubular orifice formed by the involution of the large valve, connective, not prolonged or apiculate; ov. 3-celled, style filiform, acute; fruit more or less spherical, indehiscent, supported on the persistent, reflexed, scarcely enlarged sep., pericarp coriaceous, rough; cotyledons very unequal, the larger much lobed and divided. —Endemic.

This genus is reduced to *Vateria* in the Fl. B. Ind. and to *Vatica* by A De Candolle. It has, however, as good claims to independence as many others in this family.

The following key is based mainly on the leaves, the fl. and fr. being very uniform in all.

Stipules inconspicuous, caducous.
  Fls. panicled or racemose.
    Lat. veins 21 on each side . . . . . 1. S. WIGHTII.
    Lat. veins 10–12 on each side.
      L. ovate or oblong-ovate . . . . . 2. S. GARDNERI.
      L. narrowly lanceolate-oblong . . . 3. S. ACUMINATUS.
  Fls. in clusters of 1–5.
    Lat. veins conspicuous beneath.
      Petiole under 1½ in.
        Midrib not channelled above.
          L. over 5 in. . . . . . . 4. S. LANCEOLATUS.
          L. under 5 in.
            L. ovate-oval . . . . . . 5. S. AFFINIS.
            L. obovate-oblong . . . . . 6. S. RIGIDUS.
        Midrib channelled above . . . . 7. S. CANALICULATUS.
      Petiole 2–3 in. . . . . 8. S. PETIOLARIS.
    Lat. veins conspicuous above and beneath . 9. S. OBLONGIFOLIUS.
    Lat. veins inconspicuous, unequal.
      Principal lat. veins 9 or more . . . 10. S. RETICULATUS.
      Principal lat. veins 5–6 . . . . . 11. S. NITIDUS.
      Principal lat. veins 3–5 . . . . . 12. S. NERVOSUS.
Stipules long, rigid, persistent . . . . . 13. S. MOONII.

1. **S. Wightii**, *Thw. Enum.* 37 (1858). **Hal-mendora**, *S.*
Vateria ceylanica, Wight, Ill. i. 88; Trim. Syst. Cat. Ceyl. 9. C. P. 3415.
Fl. B. Ind. i. 314 (*V. ceylanica*).

A large tree, young parts glabrous; l. 5–10 in., oval or oblong-oval, more or less rounded at base, suddenly and shortly acuminate, glabrous above, very slightly scabrous beneath, stiff, lat. veins about 21, very prominent beneath, petioles 1–2 in., stout; fl. nearly 1 in. diam., stalked, in small, axillary, pubescent panicles much shorter than the l.; sep. oval-oblong, obtuse, pubescent; pet. half as long again as sep., ovate, acute; fr. (? ripe) $\frac{5}{8}$ in., broad-ovoid, blunt, rough, sep. $\frac{3}{8}$ in.

Moist low country; rather rare. Singhe Raja Forest; Pelmadulla; Nambapana and Labugama (F. Lewis); Gilimale, Kuruwita Korale (?) Fl. April; pale yellow.

Endemic.

The Gilimale specimens are in leaf only, and are probably a new species allied to *S. Wightii.*

2. **S. Gardneri,** *Thw. in Kew Journ. Bot.* vi. 58 (1854).
Vateria Gardneri, Thw. Enum. 403. C. P. 1920.
Fl. B. Ind. i. 314. Kew Journ. Bot. vi. t. 2 A. Bedd. Fl. Sylv. t. 99.

A large tree, young parts glabrous; l. 3–4$\frac{1}{2}$ in., ovate or oblong-ovate, rounded at base, acuminate, obtuse, glabrous, thick, lat. veins 10–12, prominent beneath, petioles $\frac{1}{2}$ in., slender; fl. nearly $\frac{3}{4}$ in. diam., on rather long, curved ped. near the end of numerous, stout, erect, axillary racemes from the end of the branches; sep. broadly ovate, acute, glabrous fruit $\frac{1}{2}$–1$\frac{1}{4}$ in., nearly spherical, rough, sep. over $\frac{1}{4}$ in.

Lower montane zone; rare. Ramboda (Gardner); Gangalla, near Adam's Peak at about 5000 ft.; Maskeliya. Fl. Jan.–March; yellowish white.

Endemic.

3. **S. acuminatus,** *Bedd. Fl. Sylv. t.* 100 (1870 ?).
Vateria acuminata, Thw. Enum. 403 (non Hayne). *V. jucunda*, Thw., Trim. Syst. Cat. Ceyl. 10. C. P. 3687, 3595, 3474.
Fl. B. Ind. i. 314 (*V. jucunda*). Bedd. Fl. Sylv. t. 100.

A large tree, young parts glabrous, red; l. 3$\frac{1}{2}$–5 in., narrowly lanceolate-oblong, acute or obtuse at base, gradually caudate-attenuate, or ovate-oblong and shortly acuminate, glabrous, lat. veins 10–12, usually much curved, petioles 1–1$\frac{1}{2}$ in., slender; fl. $\frac{5}{8}$ in. diam., in stiff, few-fld., axillary racemes or panicles much shorter than the l.; sep. linear-lanceolate, acuminate; pet. scarcely longer than sep.; fr. (? ripe) small, $\frac{1}{2}$ in., depressed-globular, with 2 or 3 longitudinal furrows, sep. $\frac{1}{4}$ in. or a little longer.

Low country; rare. Ambagamuwa; by the Mahaweli between Medamahanuwara and Alutnuwara (C. P. 3595); Badulla Dist. (J.

Bailey. C.P. 3474). Apparently extends into the dry region. Fl. November; dull yellow.
Endemic.

There seem to be two forms of this, distinguishable by their leaves; *a*, as above described, and *b* with more numerous lat. veins, 14–16, which are more horizontal and less strongly marked.

4. **S. lanceolatus,** *Thw. in Kew Journ. Bot.* vi. 68 (1854).
Thw. Enum. 38. *Vateria lanceolata*, Thw. Enum. 403. C. P. 2658.
Fl. B. Ind. i. 315.

A small tree, young parts puberulous; l. 5–8 in., lanceolate, acute at base, attenuate-caudate, obtuse, glabrous, stiff, lat. veins 9–11, arched, very prominent beneath, petiole $\frac{1}{2}$–$\frac{3}{4}$ in., thickened at top; fl. few, $\frac{3}{4}$ in. diam., shortly stalked, solitary or 2 together, axillary or supra-axillary; sep. lanceolate-linear; pet. half as long again as sep.; anth. pubescent; fr. globose, 1 in., rough, sep. nearly $\frac{1}{2}$ in.

Moist low country; very rare. Karawita; near Ratnapura; Demanhandiya, Kuruwita Korale. Fl. March; yellowish-white.
Endemic.

5. **S. affinis,** *Thw. in Kew Journ. Bot.* vi. 68 (1854). [PLATE XV.]
Thw. Enum. 38. *Vateria affinis*, Thw. Enum. 403. *Vatica Thwaitesii*, A. DC. l. c. 621. C. P. 2430.
Fl. B. Ind. i. 314.

A small or moderate-sized tree, young parts glabrous, glutinous; l. deflexed, $2\frac{1}{2}$–$4\frac{1}{2}$ in., ovate-oval or ovate-lanceolate, rounded at base, more or less acuminate, obtuse, glabrous above, scabrous beneath, stiff, somewhat bullate, lat. veins 10, curved, prominent beneath, petiole $\frac{3}{4}$–$1\frac{1}{4}$ in., thickened at top; fl. $\frac{3}{4}$ in., on short, thick ped., solitary or 2 together, axillary; sep. oblong-lanceolate, acute; pet. not fully expanding, twice as long as sep., orbicular; tubular pore of anth. long; fr. nearly globular, over 1 in., with 3 grooves, rough, sep. $\frac{3}{8}$ in.; embryo bright pink.

Lower montane zone; rare. Only in the N.E. mountain-mass. Hunasgiriya; Knuckles; Rangala, at about 4000 ft., abundant. Fl. Aug.–Nov.; yellowish-white.
Endemic.
The fruit dehisces along the grooves to allow of germination but not before.

6. **S. rigidus,** *Thw. in Kew Journ. Bot.* vi. 69 (1854).
Thw. Enum. 38. *Vateria rigida*, Thw. Enum. 403. C. P. 2645.
Fl. B. Ind. i. 315.

A large tree, young parts puberulous; l. 3–5 in., oblong or obovate-oblong, tapering below but rounded at the actual base, very obtuse, often emarginate, glabrous above, minutely

scabrous beneath, very stiff and rigid, lat. veins 9–12, prominent beneath, petioles short, ½ in.; fl. ¾ in., on very short ped., about 3 together in axillary clusters; sep. oval-oblong, obtuse, puberulous; fr. not seen.

Moist region; very rare. Ambagamuwa. Fl. Dec.; yellow.
Endemic.

7. **S. canaliculatus,** *Thw. Enum.* 38 (1858).
Vateria canaliculata, Thw. Enum. 403. C. P. 3413.
Fl. B. Ind. i. 315.

A moderate-sized tree, young shoots angular, pubescent; l. 4–6 in., oval or oblong-oval, rounded at base, shortly acuminate, obtuse, glabrous above, slightly rough beneath, stiff, often somewhat bullate, midrib depressed and channelled on upper surface, lat. veins 11–12, prominent beneath, petiole 1–1½ in., pubescent, thickened at end; fl. usually solitary, supra-axillary, ped. very short; sep. ovate, acute, densely pubescent; fr. depressed-globular, 1¼ in. diam., rough, sep. ¼ in.

Moist low country; rather rare. Pasdun Korale; Reigam Korale; Nillowe Kande; Hiniduma Kande; Fl. April.
Endemic.

8. **S. petiolaris,** *Thw. Enum.* 38 (1858).
Vateria petiolaris, Thw. Enum. 403. C. P. 3151.
Fl. B. Ind. i. 315.

A moderate-sized tree, young parts roughly pubescent; l. large, 5–10 in., narrowly lanceolate-oblong, obtuse at base, shortly acuminate, obtuse, glabrous or slightly rough on veins beneath, lat. veins 13–15, petiole long, 2–3 in., slender, thickened at end; fl. ¾ in., in clusters of 1–4, axillary or extra-axillary, ped. very short; sep. ovate, acute, pubescent; fr. not seen.

Moist low country; very rare. Only collected at Kitulgala. Fl. Feb.; yellow.
Endemic.
The stamens seem to be sometimes 10 only.

9. **S. oblongifolius,** *Thw. in Kew Journ. Bot.* vi. 68 (1854).
Thw. Enum. 38. *Vateria oblongifolia*, Thw. Enum. 403. C. P. 2646.

A large tree, young parts densely puberulous; l. 2½–6 in., oval or oblong-oval, obtuse or acute at base, usually very obtuse or rounded at apex, glabrous, coriaceous, lat. veins 7–9, distant, prominent on both surfaces, petioles ½ in., channelled; fl. over ½ in., on pubescent ped., 3–5 closely placed in very short axillary racemes at end of branches;

sep. ovate, acute; fr. over ½ in., nearly globular, with 3 grooves, rough, sep. ¼ in.

Lower montane zone; very rare. Ambagamuwa, at about 4000 ft. Fl. May.
Endemic.

10. **S. reticulatus,** *Thw. Enum.* 38 (1858).
Vateria reticulata, Thw. Enum. 403. C. P. 3414.
Fl. B. Ind. i. 316.

A moderate-sized tree, young parts puberulous; l. 2½–4½ in., ovate or oblong-ovate, rounded at base, more or less acuminate, glabrous, thick, very rigid, lat. veins about 9, faintly prominent on both surfaces, the finer reticulate venation prominent beneath, petioles 1–2 in., thickened at end; fl. 1 in., on short ped., 3–5 in short axillary racemes, buds sharply pointed; sep. lanceolate, acute, glabrous; fr. large, 1¼ in., globular-ovoid, pointed, with 3 grooves, rough, sep. ¼ in.

Moist low country; very rare. Nillowe; Hiniduma Pattu, at about 1000 ft. Fl. Sept.; pale yellow.
Endemic.

11. **S. nitidus,** *Thw. Enum.* 39 (1858).
Vateria nitida, Thw. Enum. 403. C. P. 3483.
Fl. B. Ind. i. 316.

A moderate-sized tree, with whitish bark, young parts glabrous; l. 2½–3 in., ovate-oval, oval or lanceolate, acute or obtuse or rounded at base, caudate-acuminate, glabrous and shining on both sides, not coriaceous, chief lat. veins about 5 or 6, much curved, inconspicuous, petioles ⅜ in., slender; fl. solitary, axillary, ped. very short, stout; sep. lanceolate, acute, puberulous; fr. nearly globular, ¾ in. diam., sep. oblong, ½ in.

Var. β. **lancifolius,** *Dyer in Fl. B. Ind.* i. 316. *Monoporandra lancifolia*, Thw. Enum. 39. *Vateria lancifolia*, Thw. Enum. 404. C. P. 3412.

L. narrower, more gradually acuminate; ped. about ⅝ in., very slender, sometimes 2-flowered; sep. linear, very acute.

Moist low country; rare. Gilimale, Kuruwita Korale; Pasdun Korale; var. β. Hewesse. Fl. April.
Endemic.

Var. β. certainly belongs to *Stemonoporus*, but should perhaps be reckoned as distinct from *S. nitidus*.

12. **S. nervosus,** *Thw. in Trim. Journ. Bot.* xxiii. 206 (1885) (sub *Vateria*).
C. P. 3885.

L. 3–4½ in., oblong-lanceolate, acute at base, gradually

attenuate, obtuse, glabrous and shining, lat. veins 3–5, curved, faintly marked, the basal very oblique so that the leaf is there somewhat 3-nerved, petioles $\frac{3}{8}$–$\frac{1}{2}$ in.; fl. and fr. not seen.

Moist low country. Only known from the C. P. specimens (which consist of leaves only) labelled Hewesse, Sept. 1865.

A very doubtful species, and probably only a variety of *S. nitidus.*

13. **S.** (?) **Moonii,** *Thw. Enum.* 39 (1858).
Vateria Moonii, Thw. Enum. 403. C. P. 1792.
Fl. B. Ind. i. 316.

L. crowded, soon deciduous, leaving very distinct scars with which the branches are closely covered, 6–9 in., erect, lanceolate-linear, tapering at both ends, acuminate, subacute, glabrous, shining above, hairy on the veins beneath, rather thin, lat. veins about 16, oblique, much curved, prominent beneath, petioles 1 in., cylindrical, erect, fulvous-hairy when young, stip. $\frac{1}{2}$–$\frac{5}{8}$ in., linear, rigid, persistent, becoming black when old; fl. solitary in the axils of the fallen leaves among the persistent stip.; ped. and sep. stellate-hairy; fr. not seen.

Very rare, the only specimens were collected in 'Maturata(?)' by Moon, and now consist of leaves only. Thwaites, however, examined an unopened bud, and determined the genus to be *Stemonoporus.*

Very unlike the rest of the genus, the rigid, persistent, crowded stipules giving it a very singular aspect. It is greatly to be hoped that this curious plant may be rediscovered.

10. MONOPORANDRA, *Thw.*

Trees, inflor. axillary; sep. 5; pet. 5; stam. 5, fil. very short, connate at base, anth. pubescent, opening as in *Stemonoporus* by a very large terminal pore; ov. 2-celled; fruit as in *Stemonoporus.*—Endemic.

Reduced to *Vateria* (*Stemonoporus*) by Bentham and Hooker, followed by Thwaites, but maintained in Fl. B. Ind.

Fl. in stalked panicles, numerous . . . . . 1. M. CORDIFOLIA.
Fl. 1–4, in small racemes . . . . 2. M. ELEGANS.

1. **M. cordifolia,** *Thw. in Kew Journ. Bot.* vi. 70 (1854).
Thw. Enum. 39. *Vateria cordifolia*, Thw. Enum. 404. C. P. 2647.
Fl. B. Ind. i. 317. Bedd. Fl. Sylv. t. 101.

A moderate-sized tree, much branched, with smooth bark, young parts puberulous; l. $2\frac{1}{2}$–4 in., ovate or oval-ovate, rounded at base, rather suddenly caudate-acuminate, obtuse, glabrous, shining, lat. veins 6–7, conspicuous and prominent beneath, petioles $\frac{3}{4}$–1 in., slender; fl. small, on nodding pubescent ped., in small, stalked, axillary panicles much shorter

than the l.; sep. linear-lanceolate, acute, glabrous; pet. rather longer, acute; anth.-valves very unequal, pubescent; ov. pyramidal; fr. $\frac{1}{2}$ in. diam., globular, apiculate, rough, sep. $\frac{1}{6}$ in.

Moist country; rare. Not uncommon in Ambagamuwa and Sabaragamuwa districts at about 3000 ft. Fl. Dec.–April; yellow.
Endemic.
Beddome shows the ovary as 3-celled.

2. **M. elegans,** *Thw. in Kew Journ. Bot.* vi. 69 (1854).
Thw. Enum. 39. *Vateria elegans*, Thw. Enum. 404. C. P. 371.
Fl. Brit. Ind. i. 317. Kew Journ. Bot. l. c. t. 2, f. B.

A moderate-sized, much-branched tree, young parts glabrous; l. $2\frac{1}{2}$–3 in., lanceolate, obtuse at base, narrowly acuminate-caudate, obtuse, glabrous and shining, margin at base somewhat revolute, lat. veins numerous, indistinct on both surfaces, petiole $\frac{1}{4}$–$\frac{3}{8}$ in.; fl. on glabrous, filiform ped., 1–4, in small axillary racemes; sep. narrowly linear, very acute; pet. obtuse; ov. globular; fr. small, $\frac{1}{3}$ in., globose, apiculate, rough, sep. $\frac{1}{12}$ in.

Moist low country; very rare. Sabaragamuwa, at the foot of Adam's Peak, at about 2000 ft. Fl. April.
Endemic.

XXI *bis.*—ANCISTROCLADEÆ.

SHRUBS, climbing by woody hooks; l. alternate, entire, without stip.; fl. regular, bisexual; sep. combined into a 5-fid cal., the tube adherent to ov., the segments unequal, persistent and much enlarged in fruit; pet. 5, slightly connate at base; stam. 5, distinct, adnate at base to pet.; ov. *inferior*, 1-celled, with 1 erect ovule; seed with a small embryo in copious ruminate endosperm.

I have followed A. De Candolle, Planchon, Burck, and others in regarding this anomalous genus as forming a separate Natural Order. Its affinities are very doubtful, but it cannot be placed in Dipterocarpaceæ, as is done in Gen. Plant. and Fl. B. Ind.

ANCISTROCLADUS, *Wall.* (*Bigamea*,* Koen. in Endl.).
For characters, see Order.—Sp. 10; 7 in *Fl. B. Ind.*

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* From 'Bigam,' the name of the place in Ceylon where Koenig collected it in Feb. 1781. It is difficult to say what locality can have

A. Vahlii, *Arn. in Nov. Act. Nat. Cur.* xviii. 325 (1836). **Gonawel,** *S.* (PLATE XVI.)

Wormia hamata, Vahl in Skrift. Nat. Selsk. Kjob. vi. 105. Planch. in Ann. Sc. Nat. 3, xiii. 317. Thw. Enum. 188. C. P. 1600. Fl. B. Ind. i. 299.

A scrambling, shrubby, sarmentose climber, with smooth, shining, pale brown bark, branches short, divaricate, provided with 1–4 distant, reflexed, rigid hooks (leafless petioles ?), curved nearly into a ring and ultimately woody, young parts glabrous ; l. crowded at ends of branches, sessile, disarticulating by a large scar, 4–7 in. or more, narrowly oblong-lanceolate, much attenuate at base, obtuse or acute, entire, glabrous and shining, pinkish-orange when young, without stip.; fl. few, small, $\frac{1}{6}$ in., nearly sessile, distant on the slender, glabrous branches of a lax, slightly branched, terminal (but apparently axillary) panicle much shorter than the l. ; cal.-tube 5-angled, segm. obtuse, unequal, the 2 outer shorter ; pet. oval, imbricate, twice the length of sep. ; base of fil. combined into a fleshy ring adnate to base of pet. ; ov. completely inferior, style articulated on a persistent, conical base, deeply 3-fid, lobes spreading, toothed ; fr. indehiscent, about $\frac{1}{2}$ in., obconic, flat-topped with a central mamilla, 5-ribbed, glabrous, shining, brown, crowned by the horizontally spreading, enlarged cal.-segm., which are oblong, obtuse, at first fleshy, afterwards chartaceous, 3–5-veined, the 2 shorter $\frac{1}{2}$–$\frac{3}{4}$ in., the 3 longer 1–1$\frac{1}{4}$ in. ; seed solitary, at first enveloped in white, spongy tissue, afterwards filling whole cell, globular, testa very thin, endosperm copious, fleshy, much convolute-ruminated, cotyledons short, blunt, linear.

Forests and bushy places in moist region, up to about 2000 ft.; common. Fl. March-June ; pale yellow.

Endemic.

The leaves on the main branches often attain 20 in. in length.

There are specimens in Hermann's collection, but they were not distinguished by Linnæus from *Hugonia Mystax*. Thwaites has fully described and figured the structure of the fruit and seed in Trans. Linn. Soc. xxi. 225, t. 24.

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been meant by this name. *Bigamea* perhaps has generic priority, as Wallich's *Ancistrocladus* was not defined. Arnott (l. c.) simply quotes Vahl's description of *Wormia hamata*.

XXII.—MALVACEÆ.

HERBS, shrubs or trees, often with stellate hairs; l. alternate, simple (very rarely compound), with stip. (absent in *Cullenia*); fl. regular, bisexual, usually with a whorl of (often connate) bracteoles outside cal.; sep. 5, more or less combined into a cal., valvate; pet. 5, usually connate at base (very rarely 0), twisted; stam. indef. (rarely def.), fil. usually monadelphous, forming a tube adnate to base of pet., rarely in 5 bundles (in *Dicellostyles* nearly distinct), anth. 1-celled; ov. 2–many-celled, with 1 or more axile (rarely erect) ovules in each cell; styles distinct or more or less connate; fruit either apocarpous with distinct dehiscent or indehiscent 1–5-seeded carp., or a loculicidal capsule (in *Julostylis* 1-seeded and indehiscent); seeds with a curved embryo and leafy often crumpled cotyledons (fleshy in *Cullenia*); endosperm scanty or 0.

Stam. monadelphous.	
Ripe carp. separating from axis.	
Styles as many as carp.	
Carp. 1-seeded	1. SIDA.
Carp. 3–5-seeded.	
Fl. solitary axillary	2. ABUTILON.
Fl. in panicles	3. WISSADULA.
Styles twice as many as carp.	
Carp. set with spines	4. URENA.
Carp. smooth	5. PAVONIA.
Fruit capsular.	
Stam. 10	6. JULOSTYLIS.
Stam. numerous.	
Styles spreading, 2	7. DICELLOSTYLES.
Styles spreading, 5	8. HIBISCUS.
Styles connate	9. THESPESIA.
Stam. 5-adelphous (*Bombaceæ*).	
Bracteoles 0. Pet. conspicuous.	
Stam. numerous; style 5-fid	10. BOMBAX.
Stam. apparently 5; style undivided . .	11. ERIODENDRON.
Bracteoles 3–5. Pet. 0	12. CULLENIA.

The large majority of our 36 species are coarse weedy plants of waste ground and roadsides, some of doubtful nativity in Ceylon, but now found throughout the tropical belt of the world. The curious tree, *Cullenia*, extends into the montane zone, and another montane species is the beautiful *Hibiscus angulosus*, var. *purpureus;* nearly all the rest are confined to the low country, and are especially common in the dry region, to which the genus *Pavonia* is confined.

Malvastrum tricuspidatum, A. Gray, is recorded, as *M. carpinifolium*,

from Colombo by W. Ferguson in Thw. Enum. 441. The specimens (C. P. 3614) were collected in 1858, and were doubtless mere casuals. The species is a frequent tropical weed in both hemispheres, probably of American origin. It is figured in Fl. Brasil, fasc. 109, t. 53 under the name of *M. coromandelianum*, Garcke, but it is not, as there supposed, *Malva coromandeliana*, L. That is *Sida acuta*, as I have determined by examining Plukenet's original specimens in Herb. Mus. Brit.

Anoda hastata, Cav. At Badulla in 1888 as a weed. A native of Central America and the W. Indies, frequently found also in India. A mere casual here. The name of the genus is taken from the Sinhalese word for *Abutilon*.

1. **SIDA**, *L.*

Perennial herbs or under-shrubs; fl. axillary, solitary, without bracteoles; sep. 5, connate into a cup-shaped, 5-lobed calyx; pet. 5, connate at base and adnate to the tube of the stam.; stam. indef., tube of filaments long; ripe carp. 5–10, separating from axis, usually with a beak or awn, irregularly dehiscent, 1-seeded.—Sp. about 80; 9 in *Fl. B. Ind.*

Prostrate, trailing herbs . . . . 1. S. HUMILIS.
Erect, herbaceous or shrubby.
  Viscous-hairy . . . . 2. S. MYSORENSIS.
  Stellate-hairy.
    With recurved spines below petioles . . 3. S. SPINOSA.
    Without spines.
      L. lanceolate-oblong . . . . . 4. S. ACUTA.
      L. rhomboid-lanceolate, or cuneate-obovate 5. S. RHOMBIFOLIA.
  Velvety or silky . . . . 6. S. CORDIFOLIA.

1. **S. humilis,** *Cav. Diss.* v. 277 (1788). **Bévila,** *S.* **Palampádu,** *T*
Thw. Enum. 28. C. P. 1124.
Fl. B. Ind. i. 322 (not given for Ceylon). Cav. Diss. v. t. 134, f. 2.

A perennial herb, branches long, prostrate, trailing, rooting at the nodes, with scattered stellate hairs; l. variable in size, ½–2 in., broadly ovate, cordate at base, acute, coarsely crenate-serrate, sparsely covered with long hairs, petiole ¼–¾ in., hairy; fl. rather small, numerous, less than ½ in. diam., ped. 1 in. or more, stiff, slender, slightly hairy; cal. 5-angled, segm. triangular, very acute, with stellate hairs on margin; pet. broader than long, truncate; ripe carp. 5, pointed, very slightly bicuspidate, smooth.

Grassy ground and waste places; very common in the low country. Fl. Jan.–March; pale yellow.

Distributed generally through the Tropics.

S. veronicifolia, Lam. Encycl. i. 24 is, according to Schumann, the oldest name for this.

A specimen from Trincomalie (Glenie) has very much larger and more hairy cal. and larger coarsely crenate leaves.

The roots and leaves of this and all the other common species of *Sida* are much used in Sinhalese medicine.

2. **S. mysorensis,** *W. and A. Prod.* 59 (1834). **Giriwadi-bévila,** *S.*

Thw. Enum. 28. C. P. 1123.

Fl. B. Ind. i. 322.

An erect, perennial herb, 2–3 ft., stem more or less viscous-hairy; l. 1–2 in., ovate, cordate at base, acute or attenuate, coarsely serrate-dentate, with a tendency to be 3-lobed, softly hairy on both sides, petioles $\frac{1}{2}$–$1\frac{1}{2}$ in., hairy; fl. small, under $\frac{1}{2}$ in., ped. short, $\frac{1}{4}$–$\frac{1}{2}$ in., hairy; cal. hairy, segm. narrowly triangular, acuminate; ripe carp. 5, shortly bi-cuspidate, smooth.

Low country; rather common. Peradeniya; Haragama. Fl. all the year; yellow.

Also in Peninsular India and Burma.

3. **S. spinosa,** *L. Sp. Pl.* 683 (1753).

Herm. Mus. 2. Fl. Zeyl. n. 254. *S. alba,* L., Thw. Enum. 28. C. P. 3553.

Fl. B. Ind. i. 323. Dill. Hort. Elth. ii. t. 171, f. 210.

An erect, much-branched under-shrub, stems slender, rough, with minute stellate hairs, often with small, recurved prickles at the nodes below the petioles; l. 1–$1\frac{1}{2}$ in., oval or oblong, obtuse, coarsely crenate-serrate, glabrous above, finely stellate-pubescent beneath, petioles $\frac{1}{4}$–$\frac{5}{8}$ in., stellate-pubescent; fl. $\frac{1}{2}$ in., ped. $\frac{1}{2}$–$\frac{3}{4}$ in, slender, jointed near top; cal. hairy, segm. short, triangular, acute; ripe carp. 5, with 2 long, erect, rough beaks, equalling the cal.

Dry country; rather rare. Near Batticaloa. Probably overlooked elsewhere. Fl. March; white.

Distributed throughout the Tropics.

S. alnifolia, L. is referred to this species by Masters in Fl. B. Ind. This, however (= Fl. Zeyl. n. 253), is represented in Herb. Hermann by specimens of *S. cordifolia* and of a var. of *S. rhombifolia* (q. v.).

4. **S. acuta,** *Burm. Fl. Ind.* 147 (1768). **Gas-bévila,** *S.*

Moon Cat. 50. Thw. Enum. 27. C. P. 2760.

Fl. B. Ind. i. 323 (*S. carpinifolia*). Wight, Ic. t. 95.

A much-branched, semi-shrubby perennial, branches erect, smooth or slightly rough, with minute stellate hairs; l. $\frac{1}{2}$–$2\frac{1}{2}$ in., lanceolate-oblong, rounded at base, acute or obtuse, sharply serrate or crenate-serrate, glabrous, pale beneath, petioles $\frac{1}{4}$ in., thickened at top, slightly stellate-hairy, stip. linear-subulate, exceeding petioles, veined, ciliate; fl. $\frac{5}{8}$ in., ped. $\frac{1}{4}$–$\frac{1}{2}$ in., stellate-

pubescent; cal. nearly glabrous, segm. very broadly triangular, acute or acuminate; pet. twice as long as cal.; ripe carp. 5–11, rugose on the back, black, with two sharp, erect beaks.

Low country; common in waste ground. Fl. all the year; yellow. Throughout the Tropics.

S. carpinifolia, the name adopted for this in Fl. B. Ind., is later in date than *S. acuta*, having been given by the younger Linnæus in 1781.

5. **S. rhombifolia,** *L. Sp. Pl.* 684 (1753). **Kotikan-bévila,** *S.* **Chiṭṭamaḍḍi,** *T.*

Herm. Mus. 17. Burm. Thes. 15. Fl. Zeyl. n. 252 and n. 253 (part). Moon Cat. 50. Thw. Enum. 28. C. P. 1131, 3615.

Fl. B. Ind. i. 323. Dill. Hort. Elth. i. t. 172 f. 212.

An erect, much-branched under-shrub, branches rough with stellate hairs; l. 1–2 in., rhomboid-lanceolate, obtuse at base, acute, entire below, dentate-serrate above, glabrous above, more or less densely stellate-hairy beneath, petioles $\frac{1}{4}$ in., stellate-hairy, stip. setaceous, longer than petioles; fl. $\frac{3}{4}$ in., ped. $\frac{1}{2}$–$1\frac{1}{2}$ in., stellate-hairy; cal.-segm. broadly triangular, very acute or apiculate; ripe carp. 9–10, with or without beaks.

Var. β. **retusa,** *L.* (sp.) *S. retusa*, L., Thw. Enum. 28. C. P. 3117.

Stems prostrate, thick and woody, much branched; l. very small, cuneate-obovate, retuse, apiculate; ripe carp. usually with beaks as long as themselves.

Roadsides and waste places; a very common weed, especially var. β. in the dry country; extends into montane zone. Fl. all the year; yellow, becoming white when fading.

Throughout the Tropics.

The stems afford a good fibre.

6. **S. cordifolia,** *L. Sp. Pl.* 684 (1753). **Wal-bévila, Hin-anoda,** *S.* **Chevakanpúdu,** *T.*

Fl. Zeyl. n. 253 (part) and 255 (?). *Malva tomentosa*, L. Sp. Pl. 687. Thw. Enum. 28. C. P. 259.

Fl. B. Ind. i. 324. Dill. Hort. Elth. ii. t. 171, f. 209.

Erect, semi-shrubby, branches numerous, soft with silky, spreading hair; l. $\frac{3}{4}$–2 in., ovate, cordate at base, obtuse, strongly dentate-serrate, densely velvety on both surfaces, petioles $\frac{1}{2}$–1 in., with spreading hairs, stip. linear, caducous; fl. rather small, ped. $\frac{3}{8}$ in., woolly; cal. very woolly; segm. triangular, acute; ripe carp. 10, much wrinkled on sides, white, with 2 long, straight beaks set with reflexed hairs and a little exceeding cal.

Waste ground in the low country, especially in the dry districts common. Fl. all the year; yellow.

Found throughout the Tropics.

Fl. Zeyl. n. 255, quoted above with doubt, is the *Malva tomentosa*, L. This is represented in Hermann's Herb. by an indeterminable scrap, but his drawing seems to represent *S. cordifolia*, to which also most of Linnæus' synonyms are referable.

2. **ABUTILON,** *Gaertn.*

Herbs or shrubs, with ovate, cordate l. and axillary, solitary fl., without bracteoles; sep. pet. and stam. as in *Sida;* ripe carp. 10–20, separating from axis, with or without a beak, dehiscent along the back and top, 3–5-seeded.—Sp. 70; 11 in *Fl. B. Ind.*

Carp. more than 15.
  Fl. 2 in. diam.
    L. hairy above . . . . 1. A. ASIATICUM.
    L. densely velvety above . . . . . 2. A. MUTICUM.
  Fl. 1 in. diam. . . . . 3. A. INDICUM.
Carp. 15 or less.
  Fl. over 1 in. diam. . . . . 4. A. GRAVEOLENS.
  Fl. about $\frac{1}{2}$ in. diam. . . . . . . 5. A. CRISPUM.

1. **A. asiaticum,** *G. Don. Gen. Hist.* i. 503 (1831). **Anoda,** *S.* Herm. Mus. 52. Fl. Zeyl. n. 520. *Sida asiatica*, L., Moon Cat. 50. Thw. Enum. 27. C. P. 1135.
Fl. B. Ind. i. 326.

Stem erect, 1–2 ft., somewhat woody below, slightly branched, densely pubescent; l. $1\frac{1}{2}$–2 in., ovate, deeply cordate at base, acute, dentate-serrate, slightly hairy and rugose above, velvety and with prominent veins beneath, petioles $1\frac{1}{4}$–$1\frac{1}{2}$ in., tomentose; fl. large, 2 in., ped. $1\frac{1}{2}$–2 in., stout, jointed near top, tomentose; cal. densely tomentose outside, very hairy within, cut about $\frac{1}{2}$ way down, lobes oval, acuminate, 3-veined, ultimately deflexed; ripe carp. about 20, very densely covered on the back with long white hair, pointed but not beaked; seeds about 3, kidney-shaped, smooth.

Waste ground, chiefly in the dry country; rather rare. Anuradhapura; Kottiyar (Nevill). Fl. July–Sept.; yellow.
Found in the Tropics of both hemispheres.
I have very few notices of this, but it has probably been overlooked. In our few specimens the valves of the ripe carp. are never awned, but end in an acute angle.

A. polyandrum, W. and A. This is C.P. 1186, and the specimens were from the Botanic Garden. It has not been found wild in Ceylon (see Thw. Enum. 27), but there is a drawing and description by Moon in Mus. Brit. made in 1823, wherein it is said to be 'a native of the vicinity of Kandy,' with the native name 'Boo Anoda.' In Moon Cat. 50 it is entered as *Sida persica*, which is Burman's name for it.

2. **A. muticum,** *G. Don, Gen. Hist.* i. 502 (1831).
Thw. Enum. 27. C. P. 3259.
Fl. B. Ind. i. 327.

Shrubby, branches with fine dense pubescence mixed with long spreading hairs; l. 1½–3 in., broadly ovate, cordate at base, acute, irregularly dentate, velvety on both sides, petioles ½–1 in., densely hairy, stip. linear-falcate, deflexed; fl. very large, 2 in., ped. ¾–1 in., stout, very hairy; cal. densely felted, segm. shallow, triangular, very acute; ripe carp. 20 or more, obscured by dense tomentum and forming a depressed-globular fruit, quite without beaks; seeds 3, finely muriculate, hairy.

Low country; very rare. Only found about Tangalla, S. Prov. Fl. Sept.–Jan.; orange-yellow.

Found in N.W. India, and extends to Affghanistan, Trop. Africa, and Egypt.

3. **A. indicum,** *G. Don, Gen. Hist.* i. 504 (1831). **Anoda,** *S.* **Peruntutti, Vaḍḍattutti,** *T.*
Fl. Zeyl. n. 519 (?). Thw. Enum. 27. C. P. 1133.
Fl. B. Ind. i. 326. Wight, Ic. t. 12.

A semi-shrubby perennial, branches very finely downy; l. ¾–2 in., broadly ovate, very cordate at base, acute, irregularly and coarsely dentate or erose, white, with very fine dense pubescence on both sides, especially beneath, petioles very long, 1–3 in.; fl. about 1 in., nodding; ped. slender, jointed near top; cal.-lobes shallow, apiculate; ripe carp. 15–20, readily separating when ripe, sparsely and roughly hairy on back, beak short, sharp, spreading horizontally; seeds minutely dotted.

Dry country; common. Fl. most of the year; orange-yellow.

Found throughout the Tropics.

I suspect Fl. Zeyl. n. 519 to be this, but there are no specimens in Hermann's Herb., only a drawing. Linnæus refers it to his *Sida Abutilon* (*Abutilon Avicennæ*, Gaertn.).

4. **A. graveolens,** *W. and A. Prod.* 56 (1834). **Vaḍḍattutti,** *T.*
Thw. Enum. 27. C. P. 1134.
Fl. B. Ind. i. 327.

A much-branched shrub, 4–6 ft., branches covered with minute glandular pubescence mixed with long white spreading hairs; l. 2–3½ in., ovate, very deeply cordate, acute, more or less dentate, softly pubescent on both sides, whitish beneath, petiole 1–2 in., with spreading hair, stip. setaceous, usually soon falling; fl. 1¼ in. (often apparently terminal), ped. 1½–2½ in., erect, stout, thickened at top, jointed below upper third; cal. very large, densely pubescent, becoming

considerably larger in fruit, deeply divided into ovate-triangular, long, acuminate segm.; ripe carp. 10–15, scarcely exceeding enlarged cal., coherent, hairy on the back, splitting down whole length, beak short, triangular, acute, horizontal; seeds 4–5, slightly hairy.

Waste ground in the low country; common, especially in the dry districts. Fl. March–July; yellow becoming pink when withering.

All the Tropics.

I do not notice any scent in the Ceylon plant.

5. **A. crispum,** *G. Don, Gen. Hist.* i. 502 (1831).
Thw. Enum. 401. C. P. 3646.
Fl. B. Ind. i. 328 (not given for Ceylon). Wight, Ic. t. 68.

A large annual herb, branches with spreading hair; l. 2½–3½ in., ovate, cordate, acute, crenate-serrate, pubescent above, softly hairy beneath, petioles 1½–2 in., hairy, stip. setaceous, hairy; fl. small, about ½ in., ped. ¾ in., very slender, jointed about the middle; cal. segm. lanceolate, acute; ripe carp. about 12, forming a globose fruit, papery, with a few long hairs on back, without beaks.

Moist low country; very rare. Only collected near Colombo in Aug., 1859, by W. Ferguson, and possibly an introduced casual.

Occurs in S. India, and commonly in Trop. and Sub-trop. America.

3. WISSADULA,* *Medik.*

Fl. in large panicles, otherwise as in *Abutilon.* — Sp. about 6.

Based on habit merely, this genus can scarcely be considered distinct from *Abutilon.*

3. **W. zeylanica,** *Medik. Malv.* 25 (1787). **Kiri-kaju,** *S.*
Herm. Mus. 31. Burm. Thes. 2. Fl. Zeyl. n. 251. *Sida periplocifolia*, L. Sp. Pl. 684; Moon Cat. 50. *W. periplocifolia*, Thw. Enum. 27. C. P. 1132.
Fl. B. Ind. i. 325 (*W. rostrata*). Dill. Hort. Elth. i. t. 3 (cult. from Ceylon seed).

Semi-shrubby, 3–4 ft., erect, much-branched above, more or less covered with stellate tomentum; l. 2½–3½ in., deltoid-

* From the Sinhalese name 'Wisaduli,' which has been very variously applied. Hermann (in Par. Bat. Prod. 309) gives it for this; but in Mus. Zeyl. 11 refers it to *Knoxia zeylanica*, which also represents it in his Herbarium. But at p. 42 of Mus. he applies the name to some parasitic or epiphytic plant, and Moon (Cat. 60) gives it to *Cymbidium bicolor.* I find the name in use still, but for the little prostrate weed, *Centipeda orbicularis* (q. v.). 'Wisa'=poison, and Hermann explains it as meaning the pain and inflammation caused by the bite of the cobra; 'duli' is a very fine powder.

ovate, cordate at base, much attenuated to acute apex, entire, glabrous above, more or less densely clothed with white or brown stellate wool beneath, petioles $\frac{1}{4}$–1 in., woolly; fl. small, $\frac{3}{8}$ in., on long, slender pubescent ped. jointed near top, at first nodding, arranged in large, lax, erect, terminal panicles; cal. puberulous, lobes ovoid, acute; ripe carp. much exceeding cal., smooth, truncate at top, spreading, acutely pointed but not beaked, dehiscent along top and outer side; seeds 2–3, pubescent.

Moist low country; common, extending rarely into the drier country and lower hills. Fl. Nov.–Feb.; pale yellow.

Throughout the Tropics.

First known from Ceylon specimens, and I see no good reason for considering this any more than our other Malvaceous weeds as an introduced plant here.

Affords an excellent fibre.

W. Leschenaultiana, Mast. (*Abutilon*, Don) is C. P. 3521. It is a common weed (as recorded in Thw. Enum. 401) in Peradeniya Gardens, but has not spread beyond them. Fl. white, appearing from Dec. and Feb. in spicate panicles.

4. **URENA,** *L.*

Herbaceous perennials, fl. axillary, solitary; bracteoles 5, adnate to cal.; sep. 5, connate below into cup-shaped cal.; pet. 5, connate below and united to tube of stam.; stam. monadelphous; anth. nearly sessile; ov. 5-celled, with 1 ovule in each cell; styles 10; ripe carp. 5, indehiscent, separating from axis, covered with glochidiate spines.—Sp. 5; 4 in *Fl. B. Ind.*

Leaves shallowly cut . . . . 1. U. LOBATA.
L. cut to below the middle . . . . 2. U. SINUATA.

1. **U. lobata,** *L. Sp. Pl.* 692 (1753). **Patta-épala,** *S.*
Fl. Zeyl. n. 256. Moon Cat. 50. Thw. Enum. 25. C. P. 3328.
Fl. B. Ind. i. 329. Dill. Hort. Elth. ii. t. 319.

A large, erect, branched herb, 2–4 ft., stem and branches densely covered with spreading stellate hairs; l. 2–3 in., rounded, shallowly cut into about 5 acute lobes, serrate, stellate-hairy on both sides, paler beneath, with sub-palmate veins, the upper ones ovate, petioles $\frac{1}{2}$–2 in., very hairy, stip. linear; fl. on short, stout, hairy ped., bracts oblong, obtuse, a little exceeding sep., hairy; ripe carp. rounded on back, densely stellate-hairy, set with stiff spines with sharp deflexed prongs at the extremities.

Waste open ground; very common. Fl. Dec.–Feb.; bright pink, darker in centre.

A weed throughout the Tropics.

An oval glandular pore is situated at the base of the midrib beneath in both species.

Affords a good fibre.

2. **U. sinuata,** *L. Sp. Pl.* 692 (1753). **Hin-épala,** *S.*

Herm. Mus. 63. Burm. Thes. 150. Fl. Zeyl. n. 257. Moon Cat. 50. Thw. Enum. 25. C. P. 1129.

Fl. B. Ind. i. 331. Burm. Thes. t. 69, f. 2.

A perennial herb, stem 2–4 ft., much branched, finely stellate-hairy; l. very variable, $1\frac{1}{2}$–3 in., rotundate, usually deeply palmately cut into 5 lobes, which are again lobed or pinnatifid, serrate, stellate-hairy on both sides; fl. as in *U. lobata*, bracts a little shorter than cal.; ripe carp. as in the last, but with the spines rather longer.

Same places as the last, and equally common. Fl. Nov.–Feb.; bright pink.

Generally distributed throughout the Tropics.

Scarcely a separate species from *U. lobata.*

5. PAVONIA, *Cav.*

Herbs; fl. axillary, solitary, bracteoles 5–14, nearly free; sep. 5, connate at base; pet. 5, connate at base and adnate to stam.; stam. monadelphous; ov. 5-celled, with 1 ovule in each cell, styles 10; ripe carp. 5, indehiscent, separating from axis, without a beak, smooth.—Sp. 60; 6 in *Fl. B. Ind.*

Bracteoles 5, broad . . . . 1. P. GLECHOMIFOLIA.
Bracteoles 8–14, setaceous.
  Ripe carp. narrowly winged on the edges . 2. P. ZEYLANICA.
  Ripe carp. not winged . . . . . . 3. P. ODORATA.

1. **P. glechomifolia,** *A. Rich. Tent. Fl. Abyss.* i. 54 (1847).

Trim. in Journ. Bot. 1885, 142.

Fl. B. Ind. i. 330. Wight, Ic. t. 4 (*Lebretonia procumbens*).

Herbaceous, stems procumbent, with a few scattered hairs; l. $1\frac{1}{2}$–2 in., roundish-ovate, cordate at base, slightly 3-lobed, acute, coarsely crenate-serrate, sparingly stellate-hairy, petioles 1 in., hairy, stip. filiform; fl. about 1 in., ped. equalling or exceeding l., slender, stellate-hairy, jointed near top, bracteoles 5, free, broadly oval, acute, longer than sep.; sep. ovate, acute; pet. twice as long as sep.; ripe carp. keeled, strongly muriculate on back and sides.

Dry or desert regions; very rare. Tissamaharama, S. Prov. 1882. Fl. December; yellow (?).

Also in Peninsular India and Burma, and extends to Arabia and Trop. Africa.

2. **P. zeylanica,** *Cav. Diss.* iii. 134 (1787).
Hibiscus zeylanicus, Moon Cat. 50 (non L.). Thw. Enum. 401. C. P. 3641.
Fl. B. Ind. i. 331. Burm. Fl. Ind. t. 48, f. 3 (poor).

A much-branched perennial herb, 2–4 ft., often slightly woody below, branches covered with short viscous pubescence mixed with longer spreading hairs; l. small, under 1 in., roundish, more or less deeply cut into 3 lobes, segm. often wedge-shaped, coarsely serrate, petioles longer than l., viscous-pubescent; fl. over $\frac{1}{2}$ in., numerous, crowded at the ends of branches, ped. $\frac{3}{4}$–1 in., viscous and hispid, jointed near the top, bracteoles 8–10, slightly connate at very base, setaceous, erect, with long, rigid, spreading hairs; ripe carp. enclosed in persistent bracteoles, rounded on back, smooth, with a narrow prominent wing along each angle.

Dry country in rocky ground; rather rare. Trincomalie; Mineri; Kattragam (Moon). Also near Colombo (Ferguson). Fl. Sept.; pink.
Peninsular India, Tropical Africa, and Mauritius.
In hot sunny places this is often extremely viscid.

3. **P. odorata,** *Willd. Sp. Pl.* iii. 837 (1800).
Fl. Zeyl. n. 266. *Hibiscus zeylanicus,* L. Sp. Pl. 697. Thw. Enum. 26. C. P. 1125.
Fl. B. Ind. i. 331.

An erect, branched, annual herb, $1\frac{1}{2}$–3 ft., stems covered with soft, viscous pubescence and a few longer hairs; l. 1–$2\frac{1}{2}$ in., roundish-ovate, cordate at base, shallowly 3–5 lobed, the lobes acute, dentate, stellate-hairy on both sides, often felted and whitish beneath, petioles longer than l.; fl. as in the last, but rather larger, bracteoles 11–14, setaceous, with copious long spreading hairs; ripe carp. gibbous on back, without any wing along the angles, glabrous or hairy.

Dry country; rather common. Batticaloa; Hambantota; Gonagama; Dambulla; Ekiriankumbura.
Fl. Dec.–April; pale pink or white.
Distribution of *P. zeylanica.*
Hermann's specimen is certainly rather *P. odorata* than *P. zeylanica,* and Linnæus' description of it also agrees with the former.

6. **JULOSTYLIS,** *Thw.*

Tree; fl. in large, lax panicles; bracteoles 4, connate below; sep. 5, connate below; pet. 5, slightly connate at base and adnate to staminal tube; stam.-tube 5-toothed at apex, bearing below the middle 10 reniform anth. on long fil.; ov. 2-celled, with two erect ovules in each cell, styles 2, woolly,

connate half way up; fruit indehiscent, 1–(or 2?) seeded; cotyledons foliaceous, plicate-convolute, no endosperm.—Monotypic, endemic.

J. angustifolia, *Thw. Enum.* 30 (1858).
Kydia angustifolia, Arn. in Nov. Act. xviii. 1, 322. C. P. 1146.
Fl. B. Ind. i. 333. Bedd. Ic. t. 280.

A small, slender, slightly branched tree, bark smooth, shoots with scurfy stellate pubescence; l. large, 5–7 in., lanceolate, rounded at base, tapering to obtuse apex, nearly entire, with a few scattered stellate hairs above, paler and stellate-hairy on veins beneath, base 3-nerved, petiole $\frac{1}{4}$ in., pubescent, stip. leafy, oval-spathulate, very obtuse, $\frac{3}{8}$ in. puberulous, caducous; fl. numerous, about $\frac{1}{2}$ in. diam. pedicellate, in large lax spreading often drooping axillary and terminal panicles, bracteoles 4, combined below to form a cup-shaped involucre, oval, acute, completely enclosing bud; sep. 5, connate halfway up, rather shorter than bracteoles, stellate-tomentose; pet. oblong, longer than sep., covered outside with stellate hairs; ov. stellate-hairy, styles densely hairy, stigmas flat; fr. globular, $\frac{1}{2}$ in., indehiscent, densely stellate-hairy, enclosed in enlarged bracteoles and sep.; seed oblong.

Moist low country, extending into its upper zone; rather common. Ambepusse (Gardner); Ruanwelle; Ambagamuwa. Fl. October; yellowish with a red centre.

Endemic.

7. DICELLOSTYLES, *Benth.*

Trees; fl. solitary, axillary; bracteoles 4, slightly connate below; sep. 5 combined into a campanulate cal.; pet. 5, slightly connate at base; stam. about 30, fil. combined at very base only, anth. reniform; ov. 2-celled, with 2 erect ovules in each cell, styles 2, connate more than half-way up, stigmas globose; fruit splitting into 2 indehiscent 1-seeded cocci.—Sp. 2; both in *Fl. B. Ind.*

D. axillaris, *Benth. in Gen. Pl.* i. 207 (1862).
Thw. Enum. 401. *Kydia axillaris*, Thw. Enum. 30. C. P. 3126.
Fl. B. Ind. i. 333. Bedd, Ic. t. 279.

A moderate-sized tree with smooth bark, young parts nearly glabrous; l. 4–7 in., ovate or ovate-lanceolate, acute or obtuse at base, tapering to obtuse apex, glabrous on both sides, petioles $\frac{5}{8}$ in., stip. linear, $\frac{3}{4}$ in., acute, with a strong midrib; fl. large, campanulate, solitary, ped. $\frac{1}{4}$–$\frac{1}{2}$ in., much dilated at apex, bracteoles 1–1$\frac{1}{4}$ in., erect, dilated at base,

obtuse, glabrous, veined; cal. $\frac{1}{2}$ in., campanulate, with 4–5 very obtuse, shallow lobes; pet. 1 in., erect, oblong, dilated and rounded at the revolute ends, densely covered within with small glandular papillæ; stam. included, the basal tube very short, forming a cone round ov., ov. globose, glandular, styles $\frac{3}{4}$ in., exserted, more or less hairy, stigmas large, globose, densely pilose; fr. over $\frac{1}{4}$ in., globose, 8-ribbed, stellate-hispid, enclosed in persistent cal. and bracteoles.

Low country; very rare. Bank of the Uma-oya near Kindegoda, 14 miles from Badulla, at about 2000 ft. First collected in April 1854, in fruit.

Fl. Feb. June, July, Oct.; yellow, red inside.

Endemic.

The erect overlapping pet. present the appearance of a campanulate corolla. The young leaves are a brilliant lake-pink.

The description is from trees flowering in the Botanic Garden, raised from seed of the wild plant.

8. **HIBISCUS**, *L.*

Herbs, shrubs or rarely trees; fl. axillary and solitary, or in an erect terminal raceme; bracteoles 4–12, rarely 0, distinct or rarely connate; sep. 5, more or less connate into a 5-lobed cal., or quite combined and spathaceous; pet. 5, staminal tube antheriferous for whole length; ov. 5-celled, with several ovules in each cell, styles 5, more or less connate, stigmas spreading; fruit a capsule, 5-celled or (spuriously) 10-celled, loculicidally dehiscent; seeds numerous.—Sp. 150; 33 in *Fl. B. Ind.*

Capsule 5-celled.
  Sep. connate for $\frac{2}{3}$ length or less.
    Bracteoles distinct.
      Bract. 10–12, with leafy appendages.
        Stip. semi-cordate, auricled . . 1. H. SURATTENSIS.
        Stip. linear-lanceolate . . . 2. H. FURCATUS.
      Bract. 5–8, without appendages.
        Tree; bract. foliaceous . . . 3. H. COLLINUS.
        Herbs; bract. setaceous or linear.
          Stem densely stellate-hairy; bract. 5 4. H. LUNARIIFOLIUS.
          Stem finely scabrid; bract. 8 . 5. H. MICRANTHUS.
          Stem slightly pubescent; bract. 5–8 6. H. VITIFOLIUS.
    Bracteoles connate at base . . . 7. H. PANDURÆFORMIS.
    Bracteoles 0 (*Lagunea*) . . . . 8. H. SOLANDRA.
  Sep. combined for whole length into a spathaceous calyx (*Abelmoschus*).
    Bracteoles setaceous, distinct.
      Bract. 5–6, very fugacious . . . 9. H. FICULNEUS.
      Bract. 8 . . . . 10. H. ABELMOSCHUS.
    Bracteoles ovate, connate for whole length 11. H. ANGULOSUS.
Capsule 10-celled (*Paritium*) . . . 12. H. TILIACEUS.

1. **H. surattensis,** *L. Sp. Pl.* 696 (1753). **Hin-napiritta,** *S.*
Herm. Mus. 65. Burm. Thes. 135. Fl. Zeyl. n. 264. Moon Cat. 51. Thw. Enum. 26. C. P. 1118.
Fl. B. Ind. i. 334. Wight, Ic. t. 197.

An annual (?), erect or straggling herb, stem weak, slightly branched, glabrous or hairy, more or less set with small reflexed horny prickles; l. 2–3 in., on prickly petioles of equal length, roundish, deeply cut into 3–5, oblong, acute segments, serrate, thin, hairy on both sides, stip. broad, semi-cordate, auricled, long-ciliate; fl. 1½ in., ped. stiff, horizontally spreading, about as long as petioles or somewhat shorter, prickly, bracteoles 10–12, linear, bristly, lower half spreading, upper half erect, furnished at the middle with a large horizontally spreading leafy appendage; sep. connate at base, very acute, smooth with prickly apex, as long as bracteoles; capsule hairy.

Low country in bushy places; very common, especially in the dry region. Fl. Dec.–Feb.; yellow with a purple centre.
Throughout Tropical Asia, Africa, and Australia.

2. **H. furcatus,** *Roxb. Hort. Beng.* 51 (1814). **Napiritta,** *S.*
Thw. Enum. 26. C. P. 727.
Fl. B. Ind. i. 335.

A large scrambling or climbing semi-shrubby perennial, stem more or less tomentose or glabrous, set with numerous scattered sharp decurved hooked prickles; l. 2–3 in., roundish in outline, deeply palmately cut into 3–5 lanceolate, acute, strongly serrate segm. (the lower l. often nearly entire), glabrous or pubescent, usually very prickly on the veins beneath, petioles as long as or longer than l., stout, horizontal, cylindrical, very prickly, stip. linear-lanceolate; fl. large, 2½–4 in., ped. 1–3 in., very prickly, bracteoles 10–12, linear-setaceous, bristly, lower half spreading or reflexed, upper half erect, with a small deflexed leafy appendage at the middle; sep. connate half way, ovate, very acute, bristly, much enlarged in fruit; capsule conical-ovoid, sharp-pointed, ½ in., enclosed in thickened and enlarged connivent cal., covered with very coarse appressed bristly hair; seed compressed, rough with scattered papillæ, grey-brown.

Low country; very common, climbing over trees and bushes. Fl. Dec.–Feb.; yellow, with dark crimson centre.
Tropical Asia and Africa generally.
This is a very handsome climber, but excessively prickly. There seems to be no published figure of this common plant.

3. **H. collinus,** *Roxb. Hort. Beng.* 51 (1814).
H. eriocarpus, DC., Thw. Enum. 26. C. P. 1119.
Fl. B. Ind. i. 338.

A small, slender, much-branched tree, with smooth bark, young parts tomentose with stellate and simple hairs; l. large, 4–6 in., roundish, cordate at base, more or less deeply palmately 3-lobed (on young shoots 5-lobed), lobes acute, coarsely dentate, more or less stellate-hairy on both sides, paler beneath, petioles 1–3 in., stellate-hairy, stip. setaceous; fl. large, 4 in. or more, ped. larger than petiole, stellate-hispid, bracteoles 8, foliaceous, linear-lanceolate, undulate, attenuate, hairy; sep. as long as bracteoles, connate half way, broadly lanceolate, attenuate, hairy on both sides; capsule $1\frac{1}{2}$ in. globose, depressed or pointed, very densely and coarsely hairy; seeds smooth.

Forests of the dry country; common. Fl. Jan., Feb.; pale pink or white, with deep red-purple centre.

Also in Peninsular India.

A beautiful flowering shrub or small tree well worthy of cultivation.

4. **H. lunariifolius,** *Willd. Sp. Pl.* iii. 811 (1800).
Thw. Enum. 401. C. P. 3634.
Fl. B. Ind. i. 338. Wight, Ic. t. 6.

A large perennial erect herb, stem 6 ft. or more, branched, densely felted with rigid stellate hairs; l. 2–3 in., rounded-ovate, subcordate at base, more or less 3–5 lobed, coarsely serrate-dentate, slightly stellate-hairy on both sides, petiole very long, 2–4 in., stip. very small, subulate; fl. large, 4 in., on very short, stout, densely hispid ped., thickened at the top and closely placed at end of branch forming a racemose inflor., bracteoles 5, linear, attenuate, as long as sep.; sep. triangular, with long attenuate apex, stellate-hairy; capsule $\frac{3}{4}$ in., globose, pointed, densely stellate-hispid; seeds reniform, rough with distant stellate scales.

Low country; rare. Near Kandy, in Dumbara Dist. (Thwaites). Between Kandy and Peradeniya. Fl. Jan.; yellow, with very dark purple centre.

Also in Southern India, Burma, and Trop. Africa.

5. **H. micranthus,** *L. f. Suppl. Plant.* 308 (1781). **Perumaddi,** *T.*
H. rigidus, L. f. Suppl. Pl. 310; Moon Cat. 50. Thw. Enum. 26. C. P. 1126.
Fl. B. Ind. i. 336.

A rigid, erect, much-branched perennial herb or small shrub, 3–5 ft., stems scabrid with harsh, stellate, appressed hairs; l. small, $\frac{3}{8}$–1 in., ovate or oblong, obtuse or acute at base, acute at apex, coarsely dentate-serrate, stellate-hairy on both sides, petiole slender, $\frac{1}{4}$–$\frac{1}{2}$ in., hairy, stip. setaceous; fl. numerous, $\frac{3}{4}$ in., ped. $\frac{1}{2}$–1 in., jointed near top, bracteoles about 8, very small, setaceous; sep. small, connate at base, linear-

lanceolate, acute, hairy, much longer than bracteoles; pet. oblong, obtuse, reflexed; capsule small, over $\frac{1}{4}$ in., nearly globose, smooth; seeds horseshoe-shaped, black, covered with copious long cottony hair.

Dry region; common. Fl. Feb., &c.; white.
Throughout India, and in Arabia and Trop. Africa.
First collected by Koenig (*H. rigidus* L. f.).
A valued febrifuge medicine.

6. **H. vitifolius,** *L. Sp. Pl.* 696 (1753). **Maha-epala,** *S.* **Vaddattutti,** *T.*
Herm. Hort. Lugd.-Bat. 26. Burm. Thes. 137. Fl. Zeyl. n. 265. Moon Cat. 51. Thw. Enum. 26. C. P. 1122.
Fl. B. Ind. i. 338. Herm. Hort. Lugd.-Bat. 28.

A tall, much-branched perennial herb, stems 3–5 ft., slender, wholly pubescent or with a line of pubescence down one side; l. generally small, 1–2 in., cordate at base, palmately 3–5 lobed, lobes acute, the middle one the longest, serrate, glabrous or with a few stellate hairs beneath, stip. very small, setaceous; fl. rather large, $2\frac{1}{2}$ in., drooping, ped. over $\frac{1}{2}$ in., bracteoles 5–8, setaceous, distinct, hairy; sep. connate half-way, twice as long as bracteoles, lanceolate, acute, pubescent; capsule surrounded by the enlarged spreading cal., $\frac{5}{8}$ in. diam., depressed, apiculate, 5-winged, hairy; seeds dark brown, tubercled.

Low country, especially in the dry region; common. Fl. Aug.-Sept.; bright sulphur yellow with red purple centre.
Also in India, Trop. Africa, and Australia.
A very pretty species.

H. cannabinus, L. (C. P. 3833) is found near cooly lines, or as an occasional roadside weed (see Thw. Enum. 401), but is not a native plant nor much cultivated. It is figured in Roxb. Cor. Pl. t. 190, but its native country is doubtful.

H. Sabdariffa, L. is cultivated in gardens, and occasionally occurs wild. There is a drawing of it in Hermann's Herb., and it is Fl. Zeyl. n. 262. Generally known as 'Rozelle.'

7. **H. panduræformis,** *Burm. Fl. Ind.* 151 (1768).
Thw. Enum. 26. C. P. 3528.
Fl. B. Ind. i. 338. Burm. Fl. Ind. t. 47, f. 2 (bad).

Annual or perennial, stem 2–3 ft., slightly branched, covered with fine dense pubescence and scattered rigid tufted hairs; l. $1\frac{1}{2}$–3 in., ovate, cordate at base, acute, often slightly 3-lobed, dentate-serrate, densely tomentose-velvety on both sides, whitish beneath, petioles often as long as l.; fl. on very short stout tomentose ped., articulated below the middle, bracteoles 7–10, connate at base, erect, spathulate-linear; sep. connate two-thirds, acute, longer than bracteoles, 3-veined, hairy;

capsule ½ in., globose, shorter than cal., covered with dense, appressed, bristly hairs; seeds densely pubescent.

Dry country; rare. Atakalan Korale (Thwaites); Anuradhapura. Fl. July, August; yellow, with a purple centre.
India, Trop. Africa, and Australia.

8. **H. Solandra,** *L'Herit. Stirp.* i. 103 (1784).
Lagunea lobata, Willd.; Thw. Enum. 27. C. P. 67.
Fl. B. Ind. i. 336. Lam. Ill. t. 580 (*Solandra lobata*).

An erect annual, 1–2½ ft., stem slightly branched, pubescent or slightly hispid; lower l. ovate, upper ones more or less deeply 3-lobed, uppermost ones often deeply 3-fid or even 3-foliolate, all cordate at base, acute, coarsely serrate, hairy on both sides, petioles as long as or longer than leaves, of the upper leaves shorter, stip. setaceous; fl. few, ½ in., distant, forming an erect terminal raceme, ped. 1 in., jointed near top, pubescent, bracteoles 0; sep. connate for one-third, triangular-lanceolate, acute, 3-veined, hairy; capsule ovoid, pointed, hairy at top, as long as sep.; seeds smooth.

Roadsides and waste places in the dry region; common. Fl. Dec.–March; pink.
Also in India, Burma, and E. Trop. Africa.
The flowers are described in Fl. B. Ind. as 'yellow;' here they are always pink. I have never seen any trace of bracteoles.

9. **H. ficulneus,** *L. Sp. Pl.* 695 (1753).
Burm. Thes. 137. Fl. Zeyl. n. 263. Moon Cat. 51. *Abelmoschus ficulneus*, W. and A., Thw. Enum. 27. C. P. 1157.
Fl. B. Ind. i. 340. Wight, Ic. t. 154. Dill. Hort. Elth. i. t. 157.

A large annual herb, stem. stout, glabrous or pubescent or with a few prickles, slightly branched; l. few, roundish in outline, more or less cut palmately into 3–5 lobes, base cordate, lobes usually obovate or spathulate, serrate, hairy on both sides, petioles as long as l., pubescent or slightly prickly, stip. setaceous, soon falling; fl. 2½ in., secund, the upper in axils of quickly falling bracts and forming an erect, naked, terminal raceme, ped. ½ in., stout, hairy, dilated at top, bracteoles very small, 5–6, setaceous, caducous in very young bud; sep. connate for nearly whole length, the free filiform ends forming a long tip to the unopened buds, densely pubescent, caducous; capsule 1½ in., oval-oblong, shortly beaked, 5-angled, hispid especially on the angles; seeds globose, striate, hairy.

Low country, chiefly in the dry region; rare. Colombo (Moon); borders of Mineri Tank (Thwaites); Allai Tank, Kottiyar (Nevill); Jaffna. Fl. Jan.–March; white or pinkish, with a purplish-pink centre.
Also in Peninsular India, but often cultivated.

10. ***H. Abelmoschus,*** *L. Sp. Pl.* 696 (1753). **Kapu-kinissa,** *S.*
Herm. Mus. 40. Burm. Thes. 134. Fl. Zeyl. n. 261. Moon Cat. 51.
Abelmoschus moschatus, Moench., Thw. Enum. 27. C. P. 726.
Fl. B. Ind. i. 342. Wight, Ic. t. 399.

A tall annual, slightly branched, stems hispid with long deflexed hair; l. variable, ovate-cordate, or more usually palmately cut into 3–5 acute lobes, dentate-serrate, hairy on both sides, petiole usually longer than l., with long deflexed hairs, stip. small, subulate; fl. large, 3–4 in., solitary, often appearing to be terminal, ped. stout, curved, much thickened beneath the fl., bracteoles 8, distinct, linear, hispid, much shorter than cal.; sep. completely connate save at their points into a tube which splits down one side; capsule 2½–3 in., ovate-ovoid, acute, hispid; seeds kidney-shaped, striate.

Moist low country; rather rare, and doubtfully native. Colombo (Moon); Kandy; Badulla; Reigam Korale. Fl. September; bright yellow, with a purple centre.

Found wild or cultivated in most Tropical countries.

The seeds have a very strong odour of musk, but I do not know that they are used in Sinhalese medicine, though they have a reputation in Persia and Arabia.

H. esculentus, L. is commonly grown as a vegetable, and met with half wild in native gardens. Its capsules are the *Vandakkay,* T. so much used in Ceylon cookery.

11. **H. angulosus,** *Mast. in Fl. B. Ind.* i. 341 (1874). **Kapu-kinissa,** *S.*
Abelmoschus angulosus, Thw. Enum. 26.
Fl. B. Ind. i. 341. Wight, Ic. t. 951.
Occurs under 2 varieties:—
Var. *a.* **grandiflorus,** Thw. Enum. 26. C.P. 2567. [PLATE XVII.]

A very large perennial herb; stem more or less hispid with long hair, or nearly glabrous, l. 4–8 in., roundish, cordate at base, deeply palmately cut into 3–5 acute segm., crenate-serrate, hairy or glabrous, petioles of lower l. very long, of upper l. shorter, 1–3 in.; fl. very large, 4–5 in., forming long erect racemes, the upper part being without leaves but with short sessile ovate bracts, ped. 1½–3 in., very hispid with spreading rigid hairs, bracteoles 4, large, 1–1½ in., ovate, acute, connate throughout and completely enclosing the flower-bud, splitting down one or more sides, somewhat hispid outside, silky within, persistent with fruit; cal. 1½ in., very thin, membranous, toothed at top, splitting down one side, veinless, pubescent, caducous; pet. yellow; capsule 1½ in.,

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* *Abelmoschus* is a Latinisation of the Arabic name 'Habb-el-misk,' musk-seed.

fusiform-ovoid, much acuminate, surrounded by the persistent bracteoles or naked, very hispid with spreading hairs; seeds globose-kidney-shaped, striate with fine ciliate ridges.

Var. β. **purpureus,** Thw. Enum. 26. C. P. 1117.

Very much more hispid with sharp bristly hairs; fl. rather smaller, never in leafless racemes, pet. at first white, becoming a deep pink afterwards.

Rather common in the upper low country and lower montane zone; var. β. in upper montane zone by streams; rare. Sita-Eliya, near Hakgala; Ramboda; Ohiya Valley. Fl. Nov.–March; α. bright primrose yellow, with a small purple base; β. white, becoming rich pink.

Also in Southern India.

Both varieties very handsome. Wight describes the flowers in the Nilgiris as 'white, or very pale yellowish.' In Fl. B. Ind. the united persistent bracteoles are described as the calyx, the real calyx being overlooked, and the bracteoles said to be fugacious.

12. **H. tiliaceus,** *L. Sp. Pl.* 694 (1753). **Béli-patta,** *S.*

Herm. Mus. 45. Burm. Thes. 136. Fl. Zeyl. n. 259. Moon Cat. 50. *Paritium tiliaceum*, Juss., Thw. Enum. 26. C. P. 1120.

Fl. B. Ind. i. 343. Wight, Ic. t. 7.

A small, much-branched tree, young shoots pubescent; l. $2\frac{1}{2}$–$3\frac{1}{2}$ in., rotund, more or less cordate at base, abruptly acuminate, denticulate, smooth above, finely pubescent and white beneath, petiole 1–$1\frac{1}{2}$ in., pubescent, stip. large, $\frac{1}{2}$ in., ovate, obtuse, pubescent; fl. 3 in., appearing terminal, ped. $\frac{1}{2}$ in., stout, curved, pubescent, bracteoles 10, connate for three-fourths to form a campanulate persistent cup, sep. connate for one-third, much longer than bracteoles, lanceolate, acute, persistent; capsule $\frac{1}{2}$ in., shorter than cal., pointed, hairy, 10-celled.

Low country, chiefly near the coast; common near rivers and streams, growing gregariously. Fl. Dec.–March; pale yellow, with a crimson centre.

Widely distributed in the Tropics of both hemispheres.

Wood light, rather soft, the heart purplish-grey. The fibre of the inner bark is much used for cordage and mats.

9. THESPESIA, *Corr.*

Trees or shrubs; fl. solitary or in racemes, axillary, bracteoles 5 or 0; sep. 5, completely combined into a truncate cal.; pet. and stam. as in *Hibiscus*; ov. 4–5-celled, with many ovules in each cell; styles completely connate, stigma club-shaped; fruit a capsule, 4–5 celled, loculicidally or irregularly dehiscent.—Sp. 6; 2 in *Fl. B. Ind.*

L. 3-lobed, stellate-tomentose . . . . . . 1. T. LAMPAS.
L. entire, covered with peltate scales . . . . . 2. T. POPULNEA.

1. **T. Lampas,** *Dalz. and Gibs. Bomb. Fl.* 19 (1861).
Hibiscus Lampas, Cav., Thw. Enum. 26. C. P. 3555.
Fl. B. Ind. i. 345. Wight, Ic. t. 5.

A shrub or very small tree, branched from the base, young parts tomentose with brown stellate hair; l. 3–4½ in., cordate at base, palmately cut into 3 acute lobes, entire, stellate-pilose above, densely stellate-tomentose beneath, petiole ¼–1 in.; fl. large, 3½ in., on short ped. dilated at top, 2 or 3 in stalked axillary racemes, bracteoles about 5, very small, distant, subulate, deciduous; cal. cup-shaped, with 5 subulate distant teeth on the truncate margin, stellate-pilose, persistent; capsule 1 in., ovoid, pointed, stellate-pilose, surrounded at base by persistent cal., 4 or 5-valved; seeds glabrous.

Dry country; apparently very rare. In plenty near Bibile, Uva Prov., where it was first noticed by Thwaites in 1858. Fl. Feb.; bright yellow, with a crimson centre.

Through India, Burma, Java, and E. Trop. Africa.

2. **T. populnea,** *Soland. ex Corr. in Ann. Mus.* ix. 290 (1807).
Suriya, *S.* **Kávarachu, Puvarachu,** *T.*

Herm. Mus. 40. Fl. Zeyl. n. 258. *Hibiscus populneus*, L. Sp. Pl. 694; Moon Cat. 50. Thw. Enum. 27. C. P. 1121.
Fl. B. Ind. i. 345. Bedd. Fl. Sylv. t. 63. Wight, Ic. t. 8.

A small, much-branched, spreading tree, bark rugged, young twigs covered with peltate scales; l. 3–5 in., broadly ovate, cordate at base, attenuate, acute, entire, undulate, palmately 7-veined, more or less covered on both sides with minute peltate scales, with a glandular pore between the bases of the veins beneath, petioles 1–3 in., stip. subulate, deciduous; fl. about 2 in. diam., axillary, solitary, campanulate, ped. 1–1½ in., bracteoles 0 or very early deciduous; cal. cup-shaped, truncate, the teeth very faintly marked; capsule about 1 in., depressed-globose, somewhat lobed, surrounded at base by persistent cal., more or less covered with peltate scales, irregularly dehiscent or indehiscent; seeds woolly, large, compressed.

On the sea-coast; wild in the dry districts, but usually planted in the moist ones. Trincomalie, abundant; Batticaloa; Kalpitiya; Jaffna; Mannar. Fl. all the year; yellow, passing into purplish-pink when withering.

On the shores of the Eastern Tropics generally.

A favourite tree in our maritime towns, where it was largely planted by the Dutch as an avenue and shade tree. From the shape of the flowers it is known as 'Tulip-tree' by the English. It ripens seed only in the dry region.

Heart-wood hard, smooth, durable, dark red; much used in carriage-building at Colombo.

Hermann has transposed the Siṇhalese names of this and *Hibiscus tiliaceus*.

Gossypium herbaceum, L. There is a specimen of Cotton, apparently of this the commonly cultivated Indian species, in Hermann's Herb. (=Fl. Zeyl. n. 267). Roxburgh gives his *G. obtusifolium* as a native of Ceylon (Fl. Ind. iii. 183); this appears to be also a form of *G. herbaceum*, but we have no native Cotton. Fl. Zeyl. n. 222, referred by Parlatore in his monograph of the Cottons to *G. religiosum*, L. is *Cochlospermum* (q.v.).

G. barbadense, L. Forms of this, 'Sea Island Cotton,' 'Peruvian Cotton,' &c., the remains of cultivation, are occasionally met with semi-wild.

Adansonia digitata, L. (C. P. 1141). The Baobab trees at Mannar have long been well known, and are said to have been introduced by the Arabs. The tree is native to Trop. Africa. Roxburgh (Fl. Ind. iii. 164) quotes a letter from Gen. Hay Macdowell, written in 1802, describing one of these trees at Mantota (Mantai) nearly 50 ft. in circumference, and stating that there were then many about that place. In 1890 I observed only a few there, on the site of the ancient city of Tirukettisvaram, the largest stem measured being 48 ft. in circumference at 6 ft. from the ground. On Mannar Island itself are several dozen, very conspicuous objects in the low scrubby jungle, and Mr. M. S. Crawford, C.C.S., gives the circumference of the largest stem (in 1890) as 61 ft. 9 in., whilst the tree is only 30 ft. high. The trees fruit freely, but, though the seeds germinate well, no young plants are to be seen, being at once eaten off by cattle. The Tamil names for the tree are Papparappuḷi and Perukka, and the Roman Catholics call it 'Judas' Bag' because the fruit contains 30 seeds.

I have not seen naturalised trees elsewhere in Ceylon, but Moon (Cat. 49) gives Jaffna, and Thwaites (Enum. 28) says 'naturalised in the north.' There are specimens from Koenig in Brit. Mus. labelled by him 'in sylvis zeylanicis solo arenoso arido,' no doubt from Mannar, and collected in 1781. Specimens from Gardner in Herb. Perad. are labelled 'Batticaloa (?) 1848,' and Tennent (Ceylon, ii. 627) mentions a large tree at Puttalam in 1848, which was destroyed a few years later.

The pulp round the seeds is agreeably acid and is eaten with buffalo milk and sugar; the leaves are excellent fodder for cattle.

10. **BOMBAX**, *L.*

Large trees; l. digitate, deciduous; fl. large, axillary, no bracteoles; cal. irregularly 2–3-lobed or truncate; pet. 5, distinct, twisted in æstivation, adnate to base of cal.; stam. indef., inserted on base of cal., all connate at very base and adnate with pet., then combined into 5 bundles of 8 or 9 each and a central bundle of 15 (forming a tube round ov. and base of style), of which the five innermost are longer with larger sinuate anth., other anth. reniform; ov. 5-celled, with numerous ovules in each cell, style 5-fid at apex; fruit a leathery 5-celled capsule, loculicidally 5-valved; seeds numerous, imbedded in dense cottony wool.—Sp. 10; 2 in *Fl. B. Ind.*

B. malabaricum, *DC. Prod.* i. 479 (1824). **Katu-imbul,** *S.* **Parutti,** *T.*

Fl. Zeyl. n. 221. *B. Ceiba*, L. Sp. Pl. 511 (in part); Moon Cat. 50. *Salmalia malabarica*, Schott, Thw. Enum. 28. C. P. 545.

Fl. B. Ind. i. 349. Wight, Ill. t. 29. Bedd. Fl. Sylv. t. 82.

A tall, deciduous tree, with a straight, erect, buttressed trunk and wide-spreading branches, bark smooth, whitish, set with broad-based, conical, hard, sharp prickles, young parts glabrous; l. large, spreading, digitate, closely placed, petiole longer than lflts., glabrous, cylindrical, lflts. 3–7, lanceolate or oval, 4–8 in., middle are the largest, on short stalks, acute at base, acuminate, acute, glabrous, stip. small, triangular, acute, deciduous; fl. large, 3 in. diam., on short stout deflexed ped. solitary in axils of last year's fallen leaves near the ends of the branches, appearing before the new l.; cal. 1 in., very thick, cup-shaped, deeply obtusely 2 or 3-lobed, glabrous outside, densely silky with long white adpressed hairs within, wholly deciduous; pet. 2–3 in., obovate-oblong, obtuse or subacute, erect, recurved above, densely finely stellate-hairy outside, stellate-pilose within, thick, deciduous with cal.; stam. half as long as pet., 55–60, fil. connate only at base of bundles, pink, anth. brown; ov. conical, glabrous, closely surrounded by the tube of inner bundle of stam., style a little exceeding stam. stigmas 5, acute, spreading, recurved; capsule 3½–4 in., fusiform, blunt, glabrous, green, valves leathery densely lined within with long white cottony or silky hair; seeds ovoid, over ¼ in., smooth, glabrous, enveloped in closely packed cotton.

Low country, up to 2500 ft.; common, but often planted. Fl. Jan., Feb.; bright pinkish-red.

Also throughout India, and in Burma, Java, and Sumatra.

The well-known 'Cotton-tree,' very conspicuous in the dry season from its display of large showy flowers on the bare branches and soon after strewing the ground, followed quickly by the ripe pods. It is one of our few completely deciduous trees, and often grows to an immense size.

The calyx separates from the receptacle by a clean annular scar, and carries away with it the pet. and stam. in one piece.

Linnæus included under his *B. Ceiba* a Tropical American species also, and it is to that that his name is now restricted by botanists. Hermann does not seem to have noticed this tree.

The cotton is used for stuffing cushions, &c. The wood is very light and soft, whitish, with no heart-wood.

11. **ERIODENDRON,** *DC.*

Large trees; l. digitate; fl. in clusters, no bracteoles; cal. campanulate, rather obscurely 5-lobed, persistent; pet. 5, slightly connate at base, imbricate; stam. apparently 5 (pro-

bably three or four combined in each), connate at base into a fleshy tube and adnate to pet.; anth. large, sinuous; ov. 5-celled, with very numerous ovules in each cell; stigma obscurely 5-lobed; fruit a capsule, with a thick central axis, dehiscent by 5 thin, completely deciduous valves; seeds numerous, enveloped in copious silky cotton.—Sp. 3; 1 in *Fl. B. Ind.*

* **E. anfractuosum,** *DC. Prod.* i. 479 (1824). **Imbul, Pulun-imbul,** *S.*

Fl. Zeyl. n. 220. *Bombax pentandrum,* L. Sp. Pl. 511; Moon Cat. 50. *E. orientale,* Steud., Thw. Enum. 28. C. P. 1138.

Fl. B. Ind. i. 349. Wight, Ic. t. 400.

A tall tree, with a straight trunk, the primary branches horizontal in whorls of three, bark smooth, greenish-white, young parts glabrous; l. closely placed, on long glabrous petioles, digitate, lflts. 5–7, on short winged stalks, 3–5 in., lanceolate, acute at both ends, finely cuspidate, entire or serrulate near tip, glabrous, paler beneath, stip. ½ in., linear-filiform, deciduous; fl. 1½–2 in., in axillary clusters of 2–8 appearing with the young l. at ends of the branches, drooping, ped. about 1 in., no bracteoles; cal. ½ in., tubular-campanulate, with very shallow lobes, glabrous outside, lined with dense appressed hairs at the base within, pet. twice as long as cal., spreading, obovate-oblong, acute, densely tomentose outside, nearly glabrous within, stam. a little longer than pet., erect; ovary globular, glabrous; capsule 3½–4 in., surrounded at base by persistent cal., ovoid-fusiform, blunt, tardily dehiscent from the base upwards by 5 septifragal membranous valves, 5-celled, cells densely lined with long white silky hair which is deciduous, so that the valves are ultimately glabrous and areolate within; seeds over ¼ in., compressed-globose, quite glabrous, blackish, each surrounded by a copious crumpled mass of silky hair.

Low country up to 2000 ft., very common, but nearly always planted, and I doubt if really a native. Fl. Jan.–March; creamy-white, faintly scented.

Apparently found in Tropics of both worlds; native of Malaya (?).

Though each seed appears to have a separate investment of cotton, this is quite unconnected with the testa, and really arises from the inner side of the wall of the capsule and from the central axis; it ultimately becomes separated from these, and is then a mere stuffing round the seeds. This material is called 'Pulun,' or silk-cotton, and is largely used for stuffing cushions and pillows; of late years (under its Malay name 'Kapok') it has become an article of export on a rather large scale, chiefly to Queensland.

This tree was not noticed by Hermann, who has neither specimen nor drawing of it in his collection.

A bright red resinous gum is afforded by the stem.

12. **CULLENIA,*** *Wight.*

A tree; leaves simple, no stip.; fl. in fascicles from old wood; bracteoles 3–5, completely connate; cal. tubular, bursting irregularly; pet. 0; stam. numerous, connate into a long tube below, 5-adelphous above, anth. minute in globose clusters; ov. 5-celled, with two ovules in each cell; fruit a fleshy, spiny, slowly dehiscent, 5-celled capsule; seeds large, enveloped in an aril, cotyledons unequal, fleshy, no endosperm. —Monotypic.

C. excelsa, *Wight, Ic.* v. i. 23 (1851). **Katu-boda,** *S.*
Durio zibethinus, Moon Cat. 56 (non L.). *Durio zeylanicus*, Gardn. in Calc. Journ. Nat. Hist. viii. Thw. Enum. 28. C. P. 734.
Fl. B. Ind. i. 350. Wight, Ic. t. 1761, 2.

A moderate-sized or large pyramidal tree, with smooth grey bark, young parts completely covered with peltate scales; l. 6–7 in., lanceolate-oblong, obtuse at base, caudate-acuminate, entire, glabrous above, completely covered beneath with silvery or orange-coloured peltate scales, petiole 1 in., cylindrical, thickened at top, no stip.; fl. in large clusters from bosses on the old wood, ped. ½–1 in., jointed above the middle, bracteoles 3–5, ¾ in. long, connate throughout into a tube which splits irregularly, deciduous, covered with large peltate scales; cal. 1½ in., tubular, obscurely 5-lobed, deciduous, completely covered with very large peltate scales; stam.-tube exserted; style a little longer than stam., hairy, stigma globose, ov. oblong, scaly; fr. 4–5 in., globose or short-ovoid, densely covered with long green spines, slowly dehiscent, valves thick; seeds 2 in each cell, about 1½ in., nearly covered by the large fleshy white aril, testa hard, shining, chestnut-coloured.

Moist region, chiefly at elevations between 2000 and 5000 ft., common; rarer at lower elevations as Four Korales (Moon) and Galle (Gardner). Fl. May; reddish brown.

Also in Malabar.

This is known as the 'Wild Durian,' and it very closely resembles that Malayan fruit-tree, *Durio zibethinus*, L., in foliage and the structure of the fruit; this, however, has not the disgusting odour of the Durian, nor is it edible.

The flower-bud is completely closed up by the tubular calyx till burst open irregularly by the growth of the stamens and pistil, and the pollen is shed in the bud before it opens.

Wood light, rather soft, pale yellow.

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* Dedicated to Major-General Cullen, Resident at the Court of the Rajah of Travancore.

XXIII.—STERCULIACEÆ.

TREES or shrubs, rarely herbs; l. alternate, simple (rarely compound), with stip.; fl. regular (irregular in *Helicteres*), bi- or unisexual; sep. 5, more or less combined into cal.; pet. 5, usually somewhat connate at base, or 0; stam. 5–20 (some often reduced to staminodes), fil. more or less connate or quite monadelphous; anth. 2-celled; carp. (sometimes on a gynophore) 2–5, distinct or combined into a 5- or 1-celled ov.- with 1–many axile ovules in each, styles distinct or connate; fruit of distinct follicles or indehiscent carp., or a loculicidal capsule; seeds often winged, sometimes with aril, with or without endosperm.

Pet. 0; fl. unisexual or polygamous.
  Anth. 10–20; fr. follicular . . . . . . 1. STERCULIA.
  Anth. 5; fr. indehiscent . . . . . . 2. HERITIERA.
Pet. 5; fl. bisexual.
  Stam. 10–20.
    Fruit of spirally twisted follicles . . . 3. HELICTERES.
    Fruit a capsule.
      Tree; seeds winged . . . . . . 4. PTEROSPERMUM.
      Annual herb; seeds not winged . . . 5. PENTAPETES.
  Stam. 5.
    Fr. 5-valved, 5-seeded . . . . . . 6. MELOCHIA.
    Fr. 2-valved, 1-seeded . . . . . . 7. WALTHERIA.

An Order hardly separable from Malvaceæ. All our 12 species are inhabitants of the low country only, *Heritiera* being confined to the sea-coast.

1. **STERCULIA**, *L.*

Trees; fl. in racemes or panicles, unisexual or polygamous; cal. 5-fid.; pet. 0; stam. combined into a central column, anth. 10–20, sessile, capitate; carp. 4–5, on a gynophore, ovules 2–many; ripe carp. follicular, woody or membranous; seeds often with an aril, winged or wingless, with firm endosperm.—Sp. 60; 31 in *Fl. B. Ind.*

Seeds not winged.
  Follicles woody.
    Leaves digitate . . . . 1. S. FŒTIDA.
    Leaves simple
      Leaves palmately cut . . . . . . 2. S. URENS.
      Leaves not cut.
        Cal.-segments spreading or reflexed . . 3. S. GUTTATA.
        Cal.-segments connate at tips . . . 4. S. BALANGHAS.
  Follicles membranous (*Firmiana*) . . . . 5. S. COLORATA.
Seeds winged (*Pterygota*) . . . . . . 6. S. THWAITESII.

1. **S. fœtida,** *L. Sp. Pl.* 1008 (1753). **Telambu,** *S.*
Herm. Mus. 5. Burm. Thes. 169. Fl. Zeyl. n. 349. Moon Cat. Add. Thw. Enum. 29. C. P. 1140.
Fl. B. Ind. i. 354. Wight, Ic. tt. 181, 364.

A large tree, with whorled horizontal branches, bark thick, whitish, flaking off, twigs thick, marked with large leaf-scars; l. closely placed at ends of branches, digitate, on long petioles, lflts. 5–7, sessile, 5–7 in., lanceolate, tapering at both ends, very acute, entire, glabrous (pubescent when very young), stip. caducous; fl. $1\frac{1}{4}$–$1\frac{1}{2}$ in. diam., in erect racemose panicles 6–8 in. long, given off from the new growth immediately beneath the young l.; ped. $\frac{3}{4}$–1 in., pointed above the middle; cal. very deeply cut, segments linear-lanceolate, acute, spreading, slightly pubescent, more or less woolly within; male fl.:—stam.-column nearly $\frac{1}{2}$ in., much curved, anth. 15–20; fem. fl.:—carp. 5, woolly, gynophore $\frac{1}{3}$ in. long, styles woolly, curved downwards, abortive anth. nearly sessile, in a ring below carp.; follicles 1–5 usually 3, very large, pendulous, 5 in. long, ovoid-pyriform, blunt, bright scarlet, very thick and woody, almost flat when fully open, glabrous within; seeds several, nearly sessile, large, nearly 1 in., ovoid-oblong, glabrous, black with a small yellow aril or caruncle on one side at the base.

Low country; common, especially in the dry region. Fl. August; dull orange.

Also in Southern India, Burma, Moluccas, N. Australia, and E. Trop. Africa.

The flowers have a most offensive odour. The great pendulous red follicles gaping open and showing the black seeds within are very striking objects.

Wood very light, open in texture but tough, yellowish-white. The seeds are eaten roasted.

2. **S. urens,** *Roxb. Hort. Beng.* 50 (1814). **Kavali,** *T.*
Moon Cat. Add. Thw. Enum. 29. C. P. 2854.
Fl. B. Ind. i. 355. Roxb. Cor. Pl. i. t. 24.

A tree, with few spreading branches and thick blunt twigs, outer bark papery, flaking off, leaf-scars conspicuous, young parts pubescent; l. large, 8–12 in., on tomentose petioles about the same length, closely placed at ends of branches, rotundate, cordate at base, shallowly palmately cut into 5 caudate-acuminate lobes, slightly pubescent above, velvety beneath; fl. small, under $\frac{1}{2}$ in., pedicellate, in much-branched, glandular-pubescent panicles appearing before the leaves at the end of the branches; cal. pubescent on both sides, segments ovate-oblong, acute, tube campanulate; male fl.:—stam.-column short, anth. about 20; bisexual fl.:—few,

carp. usually 5, on a short gynophore, follicles 4–6, spreading, 1 in. long, oblong-ovoid, densely pubescent and also set with stiff red stinging bristles.

Dry country; rather rare. Uma-oya; Bintenne; Haragama. Fl. April; greenish, with a purple centre.

Also in the Indian and Malay Peninsulas.

3. **S. guttata,** *Roxb. Hort. Beng.* 50 (1814).

Thw. Enum. 29. C. P. 2723.

Fl. B. Ind. i. 355. Wight, Ic. t. 487. Bedd. Fl. Sylv. t. 105.

A tree, bark vertically furrowed, young parts pubescent; l. 5–10 in., broadly oblong-oval, rounded at base, acuminate, entire, glabrous above, stellate-hairy on veins beneath, petioles $1\frac{1}{2}$–3 in., stellate-scurfy; fl. small, $\frac{3}{8}$ in. long, on very short ped., arranged on stout horizontal branches of short pubescent panicles from ends of branches, bracts as long as ped.; cal. pubescent outside, segm. oblong, acute, ultimately very strongly reflexed; male fl.:—stam.-column long, slender, anth. 10 or 12; fem. fl.:—gynophore $\frac{1}{4}$ in., curved, carp. very woolly; follicles (not seen, described as) 3 in. long, obovate, villous, brilliant scarlet, with black seeds.

Moist low country; very rare. Raitunwelle; Ambagamuwa; Eratne; Kuruwita Korale. Fl. Feb.; white with pink spots.

Also in S. India, Malacca, and the Andaman Islands. A very common tree in Southern India, though so rare here.

4. **S. Balanghas,*** *L. Sp. Pl.* 1007 (1753). **Nava,** *S.*

Herm. Mus. 23. Burm. Thes. 84(?), 170. Fl. Zeyl. n. 350. Moon Cat. Add. Thw. Enum. 29. C. P. 1142.

Fl. B. Ind. i. 358. Wight, Ill. t. 30.

A tree, bark whitish, young parts pubescent; l. 3–5 in., ovate-oval, rounded at base, shortly acuminate, obtuse, recurved, entire, glabrous and shining above, paler and slightly rough with stellate pubescence beneath, petiole $\frac{1}{2}$–$\frac{3}{4}$ in., rough, stip. small, acute, hairy, deciduous; fl. small, $\frac{3}{8}$ in. diam., on rather long ped., in stellate-hairy panicles 4–5 in. long, and slightly drooping from ends of branches; cal. deeply cut, segm. linear-lanceolate, remaining connected by their tips, pubescent outside, hairy inside; anth. about 15; follicles 4–5, spreading horizontally, shortly stalked, $3\frac{1}{2}$ in. long, oblong-ovoid, acuminate, very minutely pubescent, brilliant orange-scarlet, pericarp thick, leathery, smooth within; seeds few, $\frac{7}{8}$ in. long, ovoid, jet-black, shining, with a small yellow ca-

* Linnæus took this name from Burman, but it is doubtful what plant the latter intended. I do not know any plant called Balan or Balan-gas in Siṇhalese, and Hermann gives rightly 'Nawaghas' for this.

runcle at base, embryo large, cotyledons thick, fleshy, endosperm between fleshy and horny.

Low country; common. Fl. July, August; green, with crimson hairs, sweet-scented.

Also in the Indian and Malay Peninsulas.

The brilliant red downy follicles burst along one side when mature, and show the large jet-black seeds, which remain pendulous for some time; the whole fruit is then very conspicuous as it hangs down from the tree. Each seed-coat consists of an external very thin and brittle black skin and an internal thick coriaceous coat black outside and pale shining brown within, and between them a layer of cheesy pulp.

5. **S. colorata,** *Roxb. Hort. Beng.* 50 (1814). **Malaiparutti,** *T.*
Firmiana colorata, Br., Thw. Enum. 29. C. P. 2566.
Fl. B. Ind. i. 359. Roxb. Cor. Pl. i. t. 25.

A tree with thick, spreading branches, bark very smooth, shining, white or purplish, papery, young parts glabrous; l. $3\frac{1}{2}$–5 in., cordate at base, variable in form, ovate or more or less deeply 3-lobed or deeply 5-fid., entire, lobes caudate-acuminate, glabrous or with scattered stellate hairs, petioles longer than l., stip. setaceous, pubescent; fl. polygamous, $\frac{3}{4}$ in. long, on shorter ped., in racemes 1–3 in. long appearing before the l. at the end of the branches and densely tomentose with scarlet stellate hairs; cal. tubular, with short triangular teeth, densely stellate-hairy outside, finely stellate pubescent within, usually persistent; carp. with 2 ovules; follicles 3 in., stalked, opening long before maturity, flat, leaflike, oblong-oval, veiny, obtuse, greenish-pink; seeds 2, borne on the edge of the flattened carp. near the base, $\frac{3}{8}$ in., ovoid, smooth, yellow, endosperm scanty.

On rocks in the dry region; rather common. Trincomalie; Nilgala; Kurunegala; Dambulla; Uma Oya. The C. P. specimens are from Deltota, which is out of the usual range. Fl. June, July; scarlet-orange.

In the Indian Peninsula and Burma.

The brilliant orange-scarlet flowers appear when the tree is leafless, and are thus very conspicuous. Mr. Nevill tells me that the Veddas call it 'Kénawila' and sing odes to it.

The inner bark gives a fine fibre.

6. **S. Thwaitesii,** *Mast. in Fl. B. Ind.* i. 361 (1874).
Pterygota alata, Thw. Enum. 29 (non Br.). C. P. 2963.
Fl. B. Ind. i. 361.

A tall tree with straight trunk and longitudinally cracked bark, young parts densely puberulous; l. 5–8 in., ovate-oblong, subcordate at base, obtuse, entire, thick, glabrous and shining, petioles 2 in.; fl. small, $\frac{1}{2}$ in., on short ped., in short rufous-pubescent, racemose panicles from below the new leaves; cal.

thick, densely tomentose, lobes deep, lanceolate, acute; anth. 10; follicles $2\frac{1}{2}$ in., very broad, blunt, very thick and woody, smooth; seeds numerous, $1\frac{1}{2}$ in. long, 1 in. being a terminal thick obtuse wing, cotyledons flat, endosperm copious.

Dry or intermediate country; very rare. Only found at Haragama, on the Mahaweli River, by Thwaites in 1853. Fl. Oct.; pale green.
Endemic.

2. HERITIERA, *Ait.*

Trees; fl. small, in axillary panicles, unisexual, monœcious; cal. 4- (or 5-) cleft; pet. 0; stam. combined into a very small central column, anth. 5, minute, sessile; carp. 4–5, styles distinct, ovule solitary; ripe carp. woody, indehiscent; seed solitary, large, no endosperm.—Sp. 5; 3 in *Fl. B. Ind.*

H. littoralis, *Dryand. in Ait. Hort. Kew,* iii. 546 (1789). **Étuna,** *S.* **Chomuntiri,** *T.*

Balanopteris Tothila, Gaertn. Fruct. ii. 94. Moon Cat. 73. Thw. Enum. 28. C. P. 1143.

Fl. B. Ind. i. 363. Rheede, Hort. Mal. vi. t. 21. Gaertn. Fruct. ii. t. 99.

A moderate-sized tree, bark longitudinally furrowed, young parts clothed with peltate scales; l. 5–8 in., lanceolate-oblong, rounded or acute at base, obtuse, undulate, glabrous above, completely covered beneath with minute silvery peltate scales, petiole $\frac{3}{4}$ in., stip. small, setaceous, deciduous; fl. small, $\frac{1}{6}$ in. long, the fem. rather larger, pedicellate, in pubescent, much-branched, drooping, axillary panicles shorter than l.; cal. campanulate, pubescent inside and out, lobes ovate, acute; carp. glabrous, styles tapering; ripe carp. 1–3, spreading horizontally, $2\frac{1}{2}$ in., indehiscent, broadly ovoid, depressed, the dorsal margin with a broad keel or wing, thick, woody, smooth and shining, pale brown; seed 1 in. long, with very thick cotyledons.

On the sea-coast; rather common. Panadure; Kalutara; Trincomalie; Chilaw. Fl. July to October; pale greenish-pink.

Found on all Tropical shores of the Old World, the hard indehiscent ripe carpels being carried by the waves.

According to Gaertner this is 'Tothila' of Herm. Mus. 48, of which there is no specimen in his Herb. But that Sinhalese name is properly applied to *Oroxylum indica.* Koenig's specimens are in Mus. Brit.

The heart-wood is dark red, heavy, very hard, and extremely tough and durable; it appears to be sometimes called 'Ho-mẻderiya' by the Sinhalese, a name which really belongs to a species of *Diospyros.*

Kleinhovia Hospita, L., a tree of the Malay Islands and E. Trop. Africa, is given for Ceylon in Fl. B. Ind. i. 364. It is only cultivated here, and that rarely; the C. P. 1145 specimens are from Peradeniya Gardens.

3. HELICTERES, *L.*

Shrubs; fl. in axillary clusters, irregular; cal. tubular, 5-fid.; pet. 5, unequal, connate at base, long-clawed; stam. 10, adnate to gynophore, ov. on a very long gynophore, 5-celled, styles connate; fruit of 5 linear follicles, more or less twisted spirally together; seeds many, not winged.—Sp. 30; 7 in *Fl. B. Ind.*

H. Isora,* *L. Sp. Pl.* 963 (1753). **Liniya,** *S.* **Vallampuri,** *T.*
Moon Cat. 49. Thw. Enum. 28. C. P. 1137.
Fl. B. Ind. i. 365. Wight, Ic. t. 180.

A shrub or small tree, with finely wrinkled bark, twigs rough with scattered stellate hairs; l. 2½–3½ in., distichous, rounded or cordate and oblique at base, suddenly caudate-acuminate, serrate, sometimes 3-lobed in upper part, slightly hairy on both sides, rough beneath; petioles ¼ in., stellate-pubescent, stip. setaceous, as long as petiole; fl. rather large, 1½ in. long, on short stellate-tomentose ped., 4–8 together in axillary clusters, bracts ¼ in., setaceous, hairy, buds curved, sharp-pointed; cal. ¾ in., curved, laterally compressed, tubular, with a wide mouth, 2-lipped, teeth triangular, acute, unequal, rough with stellate hairs; pet. very unequal, long-clawed, more or less connate below, obtuse, upper half ultimately reflexed, 2 lower wing-like, very much the largest, broad oval-oblong, auricled on one side above, 3 upper oblong-linear; stam.-column fused with gynophore, very much exserted, suddenly turned downwards at the end, anth. 10, in a ring round ov.; ov. conical, at end of curved gynophore, which is 1½ in. long, style as long as ov., deflexed; follicles 2–2½ in., linear, tapering to point, stellate-scurfy; seeds numerous, with a loose wrinkled testa.

Low country up to 2000 ft.; rather common. Fl. July, August; crimson, yellowish lead-colour when fading.

Found throughout India, in Java, and Trop. Australia.

The inner bark gives a very tough fibre.

The leaves are remarkably like those of the European Hazel, *Corylus Avellana.*

4. PTEROSPERMUM, *Schreb.*

Trees; fl. axillary, solitary; sep. 5, slightly connate at base; pet. 5, connate at base; stam. 20, connate at base, 5 much larger and barren; ov. shortly stalked, 5-celled; fruit a loculicidal, 5-valved, woody capsule; seeds several, winged.—Sp. 15; 11 in *Fl. B. Ind.*

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* Isora mulli is the native name given in Rheede, Hort. Mal. vi. 55.

P. suberifolium, *Lam. Ill.* iii. 136 (1823). **Welanga,** *S.* **Vinanku,** *T.*

Herm. Mus. 3. Fl. Zeyl. n. 250. *Pentapetes suberifolia*, L. Sp. Pl. 698; Moon Cat. 49. Thw. Enum. 30. C. P. 1136.

Fl. B. Ind. i. 367. Hook. Bot. Misc. iii. t. supp. 26.

A rather small tree, with thick longitudinally cracked bark, young parts finely tomentose; l. distichous, 2–4 in., obovate-oblong, rounded at base, bluntly acuminate, often irregularly lobed or jagged in the upper part, often unequal-sided, glabrous above, white or yellowish beneath with fine tomentum, petioles short, tomentose, stip. small, caducous; fl. rather large, 1–1¼ in. diam., axillary, usually solitary, on thick, tomentose, jointed ped., with several caducous bractlets; sep. ¾ in., linear, obtuse, reflexed, thick, densely stellate-tomentose outside, pubescent and with a central line of long hair within, caducous; pet. rather shorter than sep., linear lanceolate; stam. connate into a short tube at base, anth. linear; capsule 2–2½ in., oblong, attenate at base, tapering to a sharp point, covered with fine white tomentum; wing of seed broad, terminal, twice the length of the seed.

Low country, especially in the dry region; common. Fl. May; yellowish-white, very sweet-scented.

Also in Southern India and Burma.

Wood moderately hard, tough, pale red.

5. PENTAPETES, *L.*

An annual herb; fl. axillary, solitary, with caducous bracteoles; sep. 5, slightly connate at base; pet. 5; stam. 20, connate at base, 5 very much longer, barren; ov. 5-celled, with many ovules; fruit a loculicidal, 5-valved capsule; seeds numerous, angular.—Monotypic.

* **P. phœnicea,** *L. Sp. Pl.* 698 (1753).

Fl. B. Ind. i. 371. Rheede, Hort. Mal. x. t. 56.

A slightly branched annual, 2–5 ft., stem glabrous; l. very variable, 1–5 in., oblong-deltoid to linear, strongly crenate-serrate, glabrous above, with a few stellate hairs on the veins beneath, petiole short, stip. linear, as long as petiole; fl. large, 1–1½ in., solitary or 2, axillary, ped. shorter than l., jointed near the top, scabrid with few stellate hairs, bracteoles 3–5, filiform, half as long as cal., very early caducous; sep. narrow-lanceolate, very acute, caudate, scabrous with few stellate hairs; pet. obovate; barren stam. (staminodes) linear, obtuse, 3 times as long as the fertile ones; capsule subglobose, ½ in.,

shorter than the persistent sep., densely stellate-hairy; seeds angular, rough.

Dry country; very rare, and doubtfully native. Near the Giant's Tank, Mannar Dist. 1890. Fl. Feb.; bright red.

Throughout India.

This was brought by my collectors, and I have never met with it myself in Ceylon except in gardens. At the above locality it may readily have been introduced by Indian immigrants.

6. MELOCHIA, *L.*

Herbs; fl. in terminal clusters, with numerous bracteoles; sep. 5, connate below; pet. 5; stam. 5, connate into a tube at base; ov. 5-celled, with 2 ovules in each cell; fruit a loculicidal, 5-valved capsule, seed solitary in each cell.—Sp. about 50; 2 in *Fl. B. Ind.*

M. corchorifolia, *L. Sp.* 675 (1753). **Gal-kura,** *S.*

Herm. Mus. 43. Burm. Thes. 156. Fl. Zeyl. n. 246 (no specimen) and 247. *M. concatenata*, L. Sp. l. c. Moon Cat. 48. Thw. Enum. 30. C. P. 1127.

Fl. B. Ind. i. 374. Rheede, Hort. Mal. ix. t. 73. Dill. Hort. Elth. ii. t. 176.

An erect or prostrate branched herb, stem with a line of slightly stellate pubescence down one side; l. variable, often very small less than $\frac{1}{4}$ in. but sometimes 2 in. or more, ovate or oblong-ovate, rounded at base, acute or obtuse, serrate, glabrous or nearly so, petiole half as long, stip. small, lanceolate, ciliate; fl. small, nearly sessile, densely crowded in small terminal clusters with numerous hispid bracteoles; sep. lanceolate; capsule very small, depressed-globose, hispid; seeds angular, mottled black and grey.

Roadsides and waste ground; a common weed, especially in the dry country; Fl. June–August; pink.

Generally distributed through the Tropics.

M. pyramidata, L., is Fl. Zeyl. n. 245. There is no specimen in Hermann's Herb., but it is figured in Burm. Thes. t. 69, f. i. This American species is said to occur also in India as an introduced weed. I have not seen it in Ceylon.

7. WALTHERIA, *L.*

Perennial herbs; fl. very small, in axillary clusters; sep. 5, connate for $\frac{2}{3}$ below; pet. 5, connate; stam. 5, connate below; ov. 1-celled, with 2 ovules; fruit a membranous capsule irregularly 2-valved; seed solitary.—Sp. 15; 1 in *Fl. B. Ind.*

W. indica, *L. Sp. Pl.* 673 (1753). **Punnikki,** *T.*
Herm. Mus. 30. Burm. Thes. 149. Fl. Zeyl. n. 244. Moon Cat. 48. Thw. Enum. 30. C. P. 1128.
Fl. B. Ind. i. 374. Burm. Thes. t. 68.

A perennial herb, 1–3 ft., erect, slightly branched, stems softly pubescent; l. 1–2½ in., ovate or oblong-ovate, rounded or cordate at base, obtuse, crenate-serrate, closely velvety on both sides, lat. veins very prominent beneath, plicate, petiole short, woolly; fl. very small, $\frac{1}{6}$ in., sessile, in dense axillary clusters, bracteoles linear, ciliate; cal.-tube campanulate, teeth narrowly triangular, strongly ciliate, very hairy outside, persistent; capsule very small, enclosed in cal., membranous, 2-valved; seed solitary, smooth, black.

Rather common in the dry districts, rare in the moist low country. Fl. Nov.-Feb.; yellow.

Distributed throughout the Tropics as a weed.

Guazuma tomentosa, Kunth. is occasionally planted in the drier districts. It is C. P. 1114, and figured in Bedd. Fl. Sylv. t. 107.

XXIV.—TILIACEÆ.

TREES, shrubs or herbs, often with stellate hairs or scales; l. alternate, simple, with stip.; fl. regular, bisexual; sep. usually 5, distinct or connate into a cal.; pet. 5, distinct; stam. numerous, distinct, free, anth. 2-celled; disk fleshy or 0; ov. (sometimes on a gynophore) 2–5-celled, with 2–many ovules in each cell, style simple; fruit either a loculicidal or indehiscent capsule, or a drupe with 1 or 4 stones; seeds with fleshy endosperm, embryo with flat cotyledons.

Anth. opening by slits.
  Sep. combined into a calyx.
    Capsule 5-valved, not winged . . . . 1. PITYRANTHE.
    Capsule 3-valved, 6-winged . . . . . 2. BERRYA.
  Sep. distinct.
    Trees or shrubs . . . . 3. GREWIA.
    Herbs.
      Fruit indehiscent, spiny . . . . . 4. TRIUMFETTA.
      Fruit a 2–5-celled capsule . . . . . 5. CORCHORUS.
Anth. opening by a terminal pore (*Elæocarpeæ*) . . 6. ELÆOCARPUS.

With the exception of *Elæocarpus* all the genera are confined to the low country. *Pityranthe* and four species of *Grewia* occur only in the dry region. *Triumfetta* and *Corchorus* are weeds of cultivated and waste ground. Of the species of *Elæocarpus*, 4 are montane exclusively, 2 extend also into the moist low country, and one, *E. serratus*, is confined to it; none are found in the dry region.

1. **PITYRANTHE,** *Thw.*

A tree; fl. small, in panicles; cal. irregularly 5-lobed; pet. 5, distinct; stam. 20, distinct, 5 (opp. sep.) reduced to barren staminodes; ov. 5-celled, with 2 ovules in each cell; fruit a loculicidal 5-valved capsule; seed usually solitary (by abortion).—Monotypic and endemic.

P. verrucosa, *Thw. Enum.* 29 (1858). **Dik-wenna,** *S.* **Vidpani,** *T.*
C. P. 1144.
Fl. B. Ind. i. 382. Bedd. Fl. Sylv. t. 109.

A rather small tree, with erect trunk, bark smooth, young branches rough with peltate scales; l. 3–4½ in., variable, usually ovate-oblong or oblong, subcordate at base, obtuse, shallowly crenate or repand, stiff, pale green and stellate-scaly above, whitish and densely stellate-pubescent beneath, petiole ¾ in., scaly; fl. small, numerous, in erect, much-branched, terminal and axillary panicles; ped. ⅙–¼ in., scaly, buds globular-ovoid apiculate, bracts caducous; cal. campanulate, lobes triangular, acute; pet. twice as long as cal., tapering to base; 5 barren stam., linear-spathulate, shorter than the fertile; ov. globose, covered with peltate scales, style simple, as long as stam.; capsule ⅝ in., pyriform, surrounded at base with remains of persistent cal. and stam., inflated, 5-angled, very harsh, worted, yellow, 5-valved; seed usually solitary, globular, finely wrinkled, black with a few white stellate scales.

Dry districts; locally common. Jaffna (Gardner); abundant in Batticaloa District (Thwaites); plentiful in the Trincomalie District, and extending into adjacent parts of North Central Province, Tamankadua, &c., where it forms much of the undergrowth; Nilgala, rare. Fl. Sept.–Jan.; pinkish-white.

Endemic.

Wood tough, heavy, yellow, very strong, and much sought after in the E. Prov. for axles of timber carts, &c., but it is small, rarely exceeding 2½ or 3 ft. in girth.

2. **BERRYA,*** *Roxb.*

A tree; fl. in terminal panicles; cal. irregularly 3–5-lobed; pet. 5, distinct; stam. numerous, distinct, no staminodes; ov. 3- (or 4-) celled, with 4 ovules in each cell; fruit a locu-

* Named after Dr. Andrew Berry, of Madras, an eminent physician and botanist, from whom, in 1802, the Calcutta Gardens received this plant.

licidally 3-valved capsule, with 2 long wings to each valve; seeds several, hairy.—Monotypic.

B. Ammonilla,* *Roxb. Hort. Beng.* 42 (1814). **Hal-milla,** *S.* **Chavandalai,** *T.*
Moon Cat. Add. Thw. Enum. 32. C. P. 1108.
Fl. B. Ind. i. 383. Wight, Ill. t. 34. Bedd. Fl. Sylv. t. 58.

A large tree, with a straight, erect trunk and round, dense head, bark smooth, pale, young parts slightly scaly; l. 5–8 in., ovate, cordate at base, acute, entire, glabrous on both sides, undulate, bright apple-green, petioles 1–2 in., stip. $\frac{3}{8}$ in., linear-setaceous; fl. numerous, $\frac{2}{3}$ in. diam., in large lax terminal panicles, ped. nearly $\frac{1}{2}$ in., pubescent, buds globular; cal. cup-shaped, densely pubescent, lobes obtuse; pet. oblong, obtuse, ultimately reflexed; stam. very numerous; capsule surrounded at base by persistent sep. and pet., $\frac{3}{8}$ in., globose, pubescent, with 6 long, horizontally spreading, twisted, blunt, papery wings 1 in. long; seeds 1–4 in each cell, angular, densely covered with long yellow hair.

Forests of the dry country; common, extending rarely into the intermediate and moist low country. Fl. March, April; white.

Found also in Malabar and Travancore, and in Burma and the Andaman Islands; but both Wight and Beddome say they have never seen it wild in S. India.

Wood moderately heavy, straight-grained, smooth, tough, pale reddish-yellow; one of our best timbers and easily worked. Exported to Madras, where it is well known as 'Trincomalie wood' from the usual port of shipment, and used for the construction of Masula boats.

3. GREWIA,† *L.*

Trees or shrubs; infl. various, usually axillary; sep. 5, distinct; pet. 5, smaller than sep., with a glandular scale within at the base; stam. and ov. on a raised torus or gynophore; stam. numerous, distinct; ov. 2–4-celled, with 2 or more ovules in each cell; fruit indehiscent, fleshy outside, usually 4-lobed, containing 4 bony stones which are often divided into 2 or more false cells and 1–6-seeded.—Sp. 60; 36 in *Fl. B. Ind.*

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* Roxburgh gives 'Ammonilla' as the Sinhalese name, no doubt an accidental alteration of Halmilla.

† In memory of Nehemiah Grew, M.D., F.R.S., author of the 'Anatomy of Plants.' Died 1712.

Infl. axillary.
  Fruit (if fully developed) more or less 4-lobed.
    Stellate-pubescent or hairy.
      L. hairy on both sides.
        L. not white beneath . . . . . . 1. G. COLUMNARIS.
        L. white beneath . . . . . . 2. G. ASIATICA.
      L. hairy beneath on the veins.
        Fl. solitary or twin . . . . . . 3. G. BRACTEATA.
        Fl. in threes . . . . 4. G. DIPLOCARPA.
      L. glabrous on both sides . . . . 5. G. TILIÆFOLIA.
    Densely velvety-tomentose . . . . 6. G. HIRSUTA.
  Fruit globose, not lobed.
    Semiscandent ; l. pubescent beneath . . 7. G. ORIENTALIS.
    Tree ; l. glabrous . . . . 8. G. POLYGAMA.
Infl. terminal . . . . 9. G. MICROCOS.
Fl. solitary, leaf-opposed . . . . . . 10. G. POPULIFOLIA.

1. **G. columnaris,** *Sm. in Rees' Cycl.* xvii. (1811). **Kodi-taviḍdai,** *T.*
Thw. Enum. 31. C. P. 1111.
Fl. B. Ind. i. 383. Wight, Ic. t. 44.

A shrub or small tree, much-branched and twiggy, young parts stellate-pubescent ; l. 2–3 in., oval, rounded at base, bluntly acuminate, serrate-dentate, rough with stellate hairs on both sides, petiole very short, stellate-tomentose ; fl. about 1 in., on stellate-tomentose ped., $\frac{1}{2}$ in. long, in axillary and terminal, umbellate cymes, buds conical, furrowed, bracts oblong ; sep. oblong-linear, pubescent outside, recurved ; pet. $\frac{1}{3}$ length of sep., erect, acute, densely hairy within ; stam. shorter than sep. ; ov. densely hairy, style longer than stam., stigma 4-fid ; fr. subglobose, depressed, slightly 4-lobed, somewhat bristly, dark yellow.

Dry country ; rather common. Jaffna ; Puttalam ; Anuradhapura ; Kekirawa ; Kantalai ; Haragama ; Mannar ; Kurunegala. Fl. July to November ; yellowish-white.
Also in India, Java, and E. Trop. Africa.

2. ***G. asiatica,** *L. Mant.* 122 (1767).
Herm. Mus. 3. Fl. Zeyl. n. 208. Moon Cat. 41. *G. rotundifolia,* Thw. Enum. 402 (non Juss.). C. P. 3785.
Fl. B. Ind. i. 386.

A small tree, young parts densely stellate-pubescent ; l. 4–5 in., ovate-orbicular, rounded or subcordate and slightly unequal at base, acute, coarsely and irregularly serrate, puberulous above, white with dense stellate pubescence beneath, petiole $\frac{1}{4}$–$\frac{1}{2}$ in., stip. $\frac{1}{2}$ in., lanceolate or linear, acuminate ; fl. over $\frac{1}{2}$ in. diam., on slender ped., in small umbels of 2–5, on long peduncles, peduncles 1–4 together, axillary, greatly exceeding the petioles, buds obovate-oblong ;

sep. oblong-lanceolate, densely pubescent without; fr. $\frac{1}{3}$ in., globose, slightly lobed, somewhat stellate-hairy, stones 1-celled.

Low country; very rare. Kalutara (Moon); Trincomalie (Glenie); Colombo. Probably always cultivated.

Also in S. India, but usually cultivated.

Hermann calls this 'Hamdamanias.'

I do not know this plant well; in my Cat. Ceyl. Pl., p. 12, it is referred to *G. orbiculata*, Rottl.

3. **G. bracteata,** *Heyne in Roth. Nov. Sp.* 243 (1821).
Fl. B. Ind. i. 389.

'Shrubby; l. 3–4 by $1\frac{1}{2}$–$1\frac{3}{4}$ in., somewhat oblique, oval-lanceolate, serrate, base rounded, 3-nerved, secondaries arched, with straight hairs along the nerves beneath, petiole $\frac{1}{3}$ in.; peduncles equalling the petioles, axillary, solitary or twin, 3-flowered, bracts broad, pilose, as long as the peduncle, buds conical or ovoid, pilose, sulcate; sep. linear, covered with golden down; pet. much shorter than sep., oblong, entire, recurved; torus prolonged beyond the glands; drupe 4-lobed, shrivelled when dry, the size of a cherry, covered with yellow hairs, stones 2–3-celled.'

Entered on the faith of a scrap in Herb. Kew from Gardner (No. 78), and somewhat doubtful.

Also in Southern India.

I know nothing of this, and have copied the description from Fl. B. Ind.

4. **G. diplocarpa,** *Thw. Enum.* 31 (1858).
Thw. Enum. 31. C. P. 2568.
Fl. B. Ind. i. 390.

A shrub, young parts hairy; l. 3–4 in., lanceolate, acute or obtuse at base, acuminate, crenate-serrate, glabrous above, slightly hairy on veins beneath, 3-nerved at base, veins very oblique, prominent beneath, petiole $\frac{1}{2}$ in., hairy, stip. linear-setaceous, rigid; fl. over $\frac{3}{4}$ in. diam., on short ped., in threes at end of axillary peduncle, buds globular-ovoid, bracts small, ovate; sep. linear, pilose outside; pet. less than half as long; fr. 4-lobed (*i.e.*, of two didymous halves), with a few stellate hairs.

Low country; rare. Maturata; Uva (Thwaites); Uma-oya. Fl. November.

Endemic.

5. **G. tiliæfolia,** *Vahl Symb.* i. 35 (1790). **Daminiya,** *S.* **Chadachchi,** *T.*
Moon Cat. 41. Thw. Enum. 32. C. P. 621.
Fl. B. Ind. i. 386. Bedd. Fl. Sylv. t. 108.

A tree, with brownish pale bark, young parts pubescent; l. $2\frac{1}{2}$–5 in., ovate-orbicular, more or less cordate and oblique at base, obtuse, serrate, glabrous on both sides, 3–5-veined at base, petiole $\frac{3}{4}$–1 in., stip. nearly $\frac{1}{2}$ in., slightly falcate, auriculate, acuminate, veiny; fl. small, not $\frac{1}{2}$ in. diam., on slender ped., in stalked umbellate clusters of 3, several together from the axils and about equalling the petiole, buds oblong-ovoid; sep. linear-oblong, stellate-tomentose outside; pet. about half as long; fr. $\frac{3}{8}$ in., 4-lobed, slightly stellate-hairy; stones 3- or 6-celled.

Low country, and extending into lower montane zone; common. Fl. April–July; pale yellow.

Found throughout India and Burma, and in E. Trop. Africa.

A variety with very small flowers was collected near Kekirawa.

Heart-wood hard, close-grained, moderately heavy, tough, brown; a valuable wood, but of no great size. The inner bark makes good ropes. The fruit is said to be eaten.

6. **G. hirsuta,** *Vahl Symb.* i. 34 (1790).
Thw. Enum. 31. C. P. 3554.
Fl. B. Ind. i. 391. Wight, Ic. t. 76.

A low, much-branched shrub, covered throughout with dense, velvety, stellate tomentum; l. $2\frac{1}{2}$–$3\frac{1}{2}$ in., lanceolate or oblong-lanceolate, rounded and oblique at base, very acute, finely dentate-serrate, 3-nerved at base, tomentum more dense beneath, mixed above with minute scales, petiole very short, stip. $\frac{3}{8}$ in., setaceous; fl. $\frac{1}{2}$ in. diam., pedicellate, usually 2 together on short, solitary, axillary peduncles; sep. linear, very hairy outside; fr. over $\frac{1}{2}$ in., globose, slightly 4-lobed, very hairy, stones 4, 2-seeded.

Dry country; very rare. Only found about Nilgala, in Uva Province.
Fl. January; white.
Also in Southern India.

7. **G. orientalis**, *L. Sp. Pl.* 964 (1753). **Wel-kéliya, Wel-médiya,** *S.* **Taviḍdai,** *T.*
Herm. Mus. 3. Burm. Thes. 26. Fl. Zeyl. n. 324. Moon Cat. 41. Thw. Enum. 31. C. P. 1110.
Fl. B. Ind. i. 384. Rheede, Hort. Malab. v. t. 46.

A semi-scandent shrub, with smooth, cinnamon-brown bark and divaricate branches, young parts with fine rufous pubescence; l. 3–4 in., ovate-oval, rounded at base, acuminate, finely crenate-serrate, glabrous on both sides, 3-nerved at base, veins very prominent beneath, with glandular pores in their axils, petiole short, stip. small, rigid, lanceolate, soon falling; fl. about $1\frac{1}{2}$ in., in small, axillary, stalked, umbellate cymes much shorter than the l., buds ovate-oblong, blunt, bracts linear; sep. $\frac{3}{4}$ in., linear, densely stellate-hairy outside;

ov. very hairy; fr. globose, not lobed, nearly $\frac{3}{4}$ in., apiculate, densely pubescent, yellow, stones 4, 2-seeded.

Low country; rare, and perhaps not native. Chilaw (Nevill); Colombo; Hantane; common in Peradeniya Bot. Gardens, but doubtful if native there. Fl. Feb.–April; white.

Native in Southern India.

Hermann, who notes that the branches are often sarmentose, says that the wood is particularly adapted for bows.

8. **G. polygama,** *Roxb. Hort. Beng.* (1814). **Bora-daminiya,** *S.* **Taviddai,** *T.*

G. helicterifolia, Thw. Enum. 31. C. P. 1113.

Fl. B. Ind. i. 391.

A much-branched tree, with smooth, whitish bark, twigs slender, young parts pubescent; l. $1\frac{1}{2}$–3 in., distichous, oblong-lanceolate, unequal at base, acuminate, acute, finely serrate in upper part, 3-nerved at base, nearly glabrous above, white with stellate pubescence beneath, petiole short, stip. longer, linear, very acute; fl. small, under $\frac{1}{2}$ in. diam., polygamous, 3–5 in., pedunculate umbels 1–4 together from axil, buds oblong, bracts linear; sep. linear, pubescent on both sides; fr. $\frac{1}{4}$ in., globular, not lobed, hairy, stones 4, 1-seeded.

Dry country; rather common. Dambulla; Hangurankette; Anuradhapura; Karativu; Vavuniya. Fl. July–October.

Also in India, Burma, Trop. Australia.

Heart-wood heavy, rather hard, smooth, even-grained, pale brown.

9. **G. Microcos,*** *L. Syst. ed.* xii. 602 (1767). **Kéliya, Kohukirilla,** *S.*

Herm. Mus. 10. Burm. Thes. 159. Fl. Zeyl. n. 207. *Microcos paniculata*, L., Moon Cat. 41. Thw. Enum. 32. C. P. 1109.

Fl. B. Ind. i. 393. Wight, Ill. t. 33. Burm. Thes. t. 74.

A shrub, young parts stellate-pubescent; l. 4–9 in., lanceolate, rounded at base, tapering, acute, entire or nearly so, glabrous above, finely stellate-hairy beneath, 3-nerved at base, veins prominent beneath, petiole $\frac{1}{4}$–$\frac{3}{8}$ in., stip. $\frac{1}{4}$ in., linear, acuminate; fl. small, $\frac{3}{8}$ in. diam., shortly pedicellate or nearly sessile, rather crowded, in small terminal panicles, buds globular-ovoid, bracts linear; sep. lanceolate-oblong, woolly on both sides; ov. 3-celled; fr. small, $\frac{3}{8}$ in., ovoid, smooth, fleshy, purplish, stones combined into one, 3-celled, hairy.

Low country; common. Fl. June, July; White.

Throughout India, and in Burma, Java, and China.

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* *Micrŏcos* is Burman's translation of the names 'Kocurille,' 'de Kleine Cocos,' given by Hermann (who has also 'Kohukirilla'), for this plant, apparently referring to the small hard stone of the fruit, suggesting a miniature coconut.

10. **G. populifolia,** *Vahl, Symb.* i. 33. (1790). **Katu-peratti, Achchu,** *T.* [Plate XVIII.]
Trim. in Journ. Bot. 1885, 143.
Fl. B. Ind. i. 385. (Not given for Ceylon.)

A bush, with numerous divaricate branches, bark white, smooth, young parts stellate-puberulous; l. small, $\frac{1}{2}$–$1\frac{1}{4}$ in., often fasciculate, orbicular or ovate, rounded at base, obtuse, irregularly crenate-serrate, often somewhat 3-lobed, 3-nerved at base, glabrous on both sides, petiole half as long, slender, nearly glabrous, stip. small, linear, soon falling; fl. about 1 in. diam., solitary, extra-axillary or leaf-opposed, ped. about $\frac{3}{4}$ in., thickened above; sep. oblong-linear, obtuse, pubescent on both sides, 3-nerved; pet. linear, acute, $\frac{1}{2}$ as long as sep., bifid at top, basal scale broad, rotund, ciliate; gynophore short, glabrous; ov. 4-lobed, glabrous, style longer than stam., stigma with 2 reflexed lobes; fr. $\frac{1}{2}$ in. broad, of 2 separable halves, smooth, shining, yellowish-brown, each half didymous, with 2 rounded lobes, pericarp thin, brittle, pulp scanty, fibrous, stones 4, bony, compressed, muriculate, 2-celled, 2-seeded.

Desert tracts in the dry country, rather common. Puttalam (Nevill); abundant about Hambantota, Kirinda, &c.; Matalan, N. Prov. (Nevill); Mannar. Fl. Dec., July; white.

Also in Southern India, the Punjab, Sind, Affghanistan, Arabia, Tropical Africa, and Mauritius.

The pulp of the fruit is pleasantly acid.

Very unlike all the other Ceylon species.

4. TRIUMFETTA,* *L.*

Annual or perennial herbs; fl. small, yellow, in clusters opp. the l. and in spicate terminal panicles; sep. 5; pet. 5, distinct; stam. 5–25, distinct; ov. 2–5-celled, with 2 ovules in each cell; fruit small, indehiscent, spiny, 2–5-celled, with 1 or 2 seeds in each cell.—Sp. 40; 9 in *Fl. B. Ind.*

Spines of fruit not hooked	1. T. TOMENTOSA.
Spines of fruit hooked	
L. ovate-lanceolate	2. T. PILOSA.
Lower l. more or less 3-lobed	
Fruit globose, spines glabrous	3. T. RHOMBOIDEA.
Fruit somewhat ovoid, spines strongly hairy.	
L. densely stellate-pubescent beneath . .	4. T. GLABRA.
L. sparsely hairy beneath	5. T. NEGLECTA.

* J. B. Triumfetti was an Italian botanist. Died 1707.

1. **T. tomentosa,** *Boj. in Ann. Sc. Nat. ser.* 2, xx. 103. (1843.)
T. pilosa, Roth. var. *α.*, Thw. Enum. 31. C. P. 2902.
Fl. B. Ind. i. 394.

An erect, branched, perennial herb, stems softly hairy; l. 3–5 in., passing gradually into bracts in upper part of stem, ovate or ovate-lanceolate, slightly cordate at base, acute, serrate, densely stellate-tomentose on both sides, petiole ½–2 in., stip. ¼ in., setaceous; fl. small, numerous, on slender ped., clusters forming interrupted, spicate, terminal panicles, buds linear-clavate; sep. narrowly linear, apiculate, densely stellate-hairy; fr. globose, about ⅕ in., glabrous, covered with numerous straight sharp spines equalling its diam. and bristly for lower half.

A weed in cultivated ground; 'common,' according to Thwaites. I have only seen it about Peradeniya. Fl. Jan.; yellow.

Also in India, E. Trop. Africa, the Mascarene Is., and perhaps the W. Indies.

The flowers open only in the afternoon.

2. **T. pilosa,** *Roth Nov. Sp.* 223 (1821).
T. pilosa, var. *β.*, Thw. Enum. 31. C. P. 730.
Fl. B. Ind. i. 394.

A large, erect, branched, perennial herb, stems more or less shaggy with soft, stellate hair; l. 2–4 in., ovate-lanceolate or lanceolate, rounded or subcordate at base, acute, irregularly serrate, softly hairy above, felted with velvety stellate hair beneath, petiole ½–¾ in., very hairy, stip. lanceolate, acute, very hairy; fl. large, 1 in. diam., shortly pedicellate, clusters not much exceeding petioles, buds oblong-linear, rather dumb-bell-shaped; pet. strap-shaped, rather shorter and broader than sep.; fr. globose, about ¼ in., densely covered with long, spreading hair except at top, spines equalling diam., thickened at base, sharply hooked at the points, cells 4, with 1 ovoid, compressed, shining seed in each.

Bushy places in low country; rather rare. Maturata; Alutnuwara; Ramboda; Mawarelle, S. Prov.; about Ratnapura; Matale. Fl. Jan. Feb.; yellow.

Throughout the Indian and Malayan Peninsula, and in Trop. Africa.

The large bur-like fruits readily adhere to neighbouring objects.

3. **T. rhomboidea,** *Jacq. Stirp. Amer. Hist.* 47 (1763). **Épala,** *S.*
Herm, Mus. 8. Burm. Thes. 9. Fl. Zeyl. n. 174. *T. Bartramia*, L. Sp. Pl. ed. 2, 638; Moon Cat. 37. *T. angulata*, Lam., Thw. Enum. 31. C. P. 2759.
Fl. B. Ind. i. 395. Wight, Ic. t. 320.

An annual or perennial herb, 1½–3 ft., slightly branched, branches pubescent with simple hairs; l. 1–2½ in., variable,

the lower more or less deeply 3-fid, the upper ovate-lanceolate, all coarsely and irregularly serrate, simply hairy on both sides, often tomentose and white beneath, petiole of lower l. long, of upper l. very short; fl. small, $\frac{3}{8}$ in. diam., on short ped., clusters crowded into a spicate inflorescence at end of branches, buds oblong, slightly stellate-pubescent; pet. equalling sep.; stam. 8–15; fr. very small, globose, $\frac{1}{6}$ in., finely tomentose, spines less than $\frac{1}{8}$ in., glabrous, hooked, cells 3 or 4.

Waste ground in low country; a very common weed. Fl. Nov.–Feb; yellow.

Throughout Tropical Asia and Africa.

The name *T. Bartramia* has priority (1762), but Linnæus may have included in it more than *T. rhomboidea*, Jacq. as now understood.

4. **T. glabra,** *Rottl. in Spreng. Syst.* ii. 450 (1825). [PLATE XIX.] W. and A. Prod. 75. *T. conspicua*, Trim. in Journ. Bot. xxiii. 206. Fl. B. Ind. i. 395.

Semi-shrubby, stems 3–5 ft., much branched, rough with stellate hairs; l. 2–2$\frac{1}{2}$ in., sub-orbicular, rather broader than long, cordate at base, acute, irregularly crenate-dentate, somewhat 3-lobed, glabrous above, paler and finely but densely stellate-pubescent beneath; fl. rather large for genus, nearly $\frac{3}{4}$ in., pedicellate, crowded in small, stalked, paniculate clusters rather distantly arranged on the elongated, erect, quite leafless branches of the large terminal inflor., buds ovoid, crowned by a star formed of the appendages of the sep.; sep. linear, densely stellate-pubescent, with a rather long, curved, spreading, apical appendage; pet. as long as sep., broadly spathulate, ciliate at base; stam. 20; fr. small, $\frac{1}{6}$ in. diam., globular-ovoid, densely covered with yellowish pubescence of short simple hairs and set with stiff red spines $\frac{1}{8}$ in. long, hooked at the end and shortly hairy in the lower part, the upper ones erect, the others spreading, 2–4-celled, 2–4-seeded; seed smooth, yellowish-grey.

Dry country, very rare. Batticaloa (Rottler); Near Tissamaharama Tank, Hambantota, in great abundance, 1882. Mr. Nevill thinks he has seen it about Mandagalla in Eastern Prov. Fl. Dec.–Feb.; bright yellow.

Endemic.

Rottler collected this in Feb. 1796, and his specimens are now in Herb. Kew. They scarcely warrant his name *glabra*, but are less densely stellate-hairy than my Hambantota ones.

The description in Fl. B. Ind. so little agrees with the plant as to have caused me to miss the identity of my species with Rottler's, and to

give it a new name. The locality is also there given as 'Canara,' instead of Ceylon.

The most showy of the Ceylon species, quite ornamental in mass.

5. **T. neglecta,** *W. and A. Prod.* 75 (1834).
T. pilosula, Thw. Enum. 401. C. P. 2901.
Fl. B. Ind. i. 396.

An annual herb, 2–4 ft., slightly branched, stem slightly scabrous with broad-based, stellate hairs; l. 1–2½ in., the lower rotundate, acute at base, acute, somewhat 3-lobed, coarsely crenate-serrate, the upper lanceolate, all sparsely hairy or nearly glabrous on both sides, petiole as long as lower l., very short in upper ones, hairy, stip. small, triangular, acuminate, persistent; fl. very small, on short, slender, drooping ped., clusters forming an interrupted, erect, spicate inflor., buds short, ovoid; stam. 5–10; fr. about $\frac{1}{6}$ in., globular-ovoid, densely hairy, spines stiff, hooked, strongly ciliated along the upper side, upper ones erect, others spreading, cells 4.

Dry country, rare. Trincomalie; Dambulla. Fl. Jan.; yellow.
Also in Peninsular India and Trop. Africa.

5. CORCHORUS, *L.*

Annual or perennial herbs; fl. 1–3 together, small, yellow, leaf-opposed; sep. 5, distinct; pet. 5, distinct; stam. numerous, distinct; ov. 2–5-celled, with numerous ovules; fruit a loculicidal, 2–5-valved capsule, with numerous seeds.—Sp. 35; 8 in *Fl. B. Ind.*

Capsule subglobose . . . . 1. C. CAPSULARIS.
Capsule elongated.
  Capsule 5-valved . . . . 2. C. OLITORIUS.
  Capsule 2 or 3-valved.
    Capsule hairy
      L. glabrous . . . . 3. C. URTICÆFOLIUS.
      L. hairy . . . . 4. C. FASCICULARIS.
    Capsule glabrous
      Capsule not winged . . . . . . 5. C. TRIDENS.
      Capsule strongly 3-winged . . . . 6. C. ACUTANGULUS.

1.* **C. capsularis,** *L. Sp. Pl.* 529. (1753.)
Fl. Zeyl. n. 214. Moon Cat. 42. Thw. Enum. 31. C. P. 1105.
Fl. B. Ind i. 397. Wight, Ic. t. 311.

Annual, erect, glabrous; l. 2–4 in., narrowly ovate-lanceolate, rounded at base, acuminate, acute, serrate, the two lowest serratures produced into filiform deflexed tails, glabrous, 3–5-veined at base, stip. filiform, as long as petiole; fl. less than ½ in. diam., pedicellate; capsule depressed, broader

than long, ½ in. diam., ridged and muricated, 5-valved, valves woody, without transverse partitions on inside; seeds wedge-shaped, smooth, brown.

Low country; 'very common,' according to Thwaites, but I have never met with it. Kalutara (Moon); Bintenne (Gardner). A casual weed? Fl. yellow.

Native of India, and perhaps of Malaya, cultivated elsewhere in the Tropics.

There is a drawing, but no specimen in Hermann's Herb.

This is one of the species so largely cultivated for jute in Bengal, but it is not grown in Ceylon. It is, perhaps, only a cultivated race of *C. olitorius.*

2. **C. olitorius,** *L. Sp. Pl.* 529 (1753).
Thw. Enum. 31. C. P. 1107.
Fl. B. Ind. i. 397. Bot. Mag. t. 2810.

An annual or perennial herb, 3–4 ft., much branched, stems glabrous; l. 3–5 in., ovate-lanceolate, rounded at base, acuminate, acute, serrate, the two lowest serrations prolonged into deflexed filiform tails ½ in. long, glabrous on both sides, 3–5-veined at base, veins conspicuous beneath, petiole 1–1½ in., slightly pilose above, stip. ⅝ in., setaceous; fl. on very short ped., ½ in. diam., buds obovate, angled, cuspidate; sep. linear, acuminate, cuspidate; pet. longer than sep.; style papillose; capsule linear, 1¾–2½ in. long, linear, cylindrical, tapering, with 5 short points at apex, glabrous, 5-valved, valves with transverse partitions between the seeds; seeds triangular, pointed, slightly wrinkled, black.

Low country, a weed by roadsides, common, but, perhaps, introduced. Fl. July; yellow.

Native of India and Malaya, and spread by cultivation to other Tropical and Sub-tropical countries. Largely grown in Bengal for the production of jute and elsewhere as a potherb.

I have not seen much of this. It is represented in Hermann's Herb. by *C. acutangulus.*

3. **C. urticæfolius,** *W. and A. Prod.* 73 (1834).
Thw. Enum. 31. C. P. 2758.
Fl. B. Ind. i. 397.

Annual, stems 1–3 ft., softly hairy; l. 2–2½ in., ovate, rounded at base, acute, coarsely serrate, glabrous or slightly hairy above, softly hairy beneath, petiole 1–1½ in., hairy, stip. ¼ in., setaceous; fl. shortly pedicellate; sep. apiculate, very hairy; capsule about 1 in., linear, slightly curved, deflexed, beaked, hairy, 2–3-valved, valves with internal partitions between the seeds; seeds wrinkled, black.

Dry districts, rather common. Trincomalie (Moon); Puttalam (Nevill); Anuradhapura. Fl. all the year; yellow.
Also in Southern India, Burma, and Abyssinia.

4.* **C. fascicularis,** *Lam. Encycl.* ii. 104 (1786).
Thw. Enum. 401. C. P. 3773.
Fl. B. Ind. i. 398.

An annual herb, much branched, stems glabrous; l. $\frac{3}{4}$–1$\frac{1}{2}$ in., oval-oblong, rounded at base, obtuse, serrate, glabrous, petiole short, pilose, stip. linear, filiform; fl. very small, 3–5 together, nearly sessile; capsule $\frac{1}{2}$ in., cylindrical, long-beaked, very hairy, 3-valved, valves faintly septate, seeds trigonous, smooth, black.

Low country, very rare. Only found near Colombo by Ferguson in 1862, and probably a casual weed only. Fl. July.
Also in Peninsular India, and Trop. Africa and Australia.

5. **C. tridens,** *L. Mant.* ii. *app.* (1771).
Thw. Enum. 401. C. P. 3791.
Fl. B. Ind. i. 398. (Not given for Ceylon.) Burm. Fl. Ind. t. 37, f. 2 (*C. trilocularis*).

Annual, 1–2 ft., slightly branched, glabrous; l. 1$\frac{1}{2}$–2$\frac{1}{2}$ in., oblong-linear, acute, coarsely crenate-serrate, the two lowest teeth produced into filiform tails, petiole very short, stip. setaceous, about as long; fl. nearly sessile; capsule 1$\frac{1}{2}$ in., slender, glabrous, with a short beak terminating in 3 spreading or reflexed points, 3-valved, valves without partitions; seeds truncate at both ends, smooth, black.

Dry country; very rare. Trincomalie 1863 (Glenie).
Distributed through Tropical Asia, Africa, and Australia.

6. **C. acutangulus,** *Lam. Encycl.* ii. 104 (1786).
Herm. Mus. 31. Burm. Thes. 75. Fl. Zeyl. n. 213 (*C. olitorius*, L.). Moon Cat. 42. Thw. Enum. 31. C. P. 1106.
Fl. B. Ind. i. 398. Wight, Ic. t. 739.

Annual, 1–2 ft., much branched, branches slightly pubescent; l. 1–2 in., oval or ovate, rounded at base, acute, crenate-serrate, the 2 lowest teeth often prolonged into filiform tails, hairy on veins beneath, petiole hairy, stip. filiform, shorter than petiole; fl. shortly pedicellate; capsule $\frac{3}{4}$–1$\frac{1}{4}$ in., erect, cylindrical, truncate, 6-angled, 3 of the angles strongly winged and terminating above in a horizontal or recurved beak, 3- (or 4-) valved, valves slightly septate; seeds truncate, rough, dark brown.

Low country; a common weed. Fl. Dec.–Jan.; yellow.
Throughout the Tropics of both worlds.
Much the commonest species in Ceylon. This represents *C. olitorius*, L., in Hermann's Herb. It is called 'Jaladara' by Moon.

6. **ELÆOCARPUS,*** *L.*

Trees; fl. in axillary racemes; sep. 5, distinct; pet. 5, distinct, laciniate; stam. 15–30, inserted within a fleshy, 5-lobed disk; anth. linear, opening by a terminal pore; ov. 2–3-celled, with 2–many ovules in each cell; style simple; fruit an indehiscent drupe, with fleshy epicarp and hard, bony stone, usually 1-celled, 1-seeded; cotyledons flat, endosperm copious.—Sp. 50; 40 in *Fl. B. Ind.*

One anther-valve tipped with a brush of hairs .	1. E. SERRATUS.
Anther-valves equal, not bearded.	
L. glabrous beneath.	
L. oval; petiole 1 in. long	2. E. AMŒNUS.
L. obovate; petiole very short . . .	3. E. OBOVATUS.
L. pubescent beneath.	
L. rotundate, very obtuse	4. E. MONTANUS.
L. oval	5. E. SUBVILLOSUS.
One anther-valve elongated into a beak or bristle (*Monocera*).	
L. ovate	6. E. ZEYLANICUS.
L. lanceolate attenuate	7. E. GLANDULIFER.

1. **E. serratus,** *L. Sp. Pl.* 515 (1753). **Weralu,** *S.* [PLATE XX.]
Herm. Mus. 9. Burm. Thes. 93. Fl. Zeyl. n. 206. Moon Cat. 42. Thw. Enum. 32. C. P. 539.
Fl. B. Ind. i. 401 (not given for Ceylon). Burm. Thes. t. 40. Lam. Ill. Gen. t. 459, f. 2 (fruit).

A rather small tree, young parts pubescent; l. 2–4 in., oval or obovate-oval, acute at base, obtuse, often rounded at apex, usually shallowly crenate-serrate, glabrous, paler beneath, with glandular thickenings in the vein-axils, petiole $\frac{1}{2}$ in.; fl. drooping, in numerous racemes from axils of past and present l. and rather shorter than them, ped. as long as sep., bracts none, buds conical; sep. $\frac{1}{4}$ in., lanceolate, acute, finely pilose or glabrous; pet. larger than sep., with a broad cuneate base, cut more than half-way down into numerous filiform laciniæ; stam. 25–35, fil. short, anth. linear, black, one valve tipped with a brush of hairs half as long; disk hairy, orange; ov. hairy, 3-celled; drupe 1–1$\frac{1}{4}$ in., ovoid, bluntly pointed, smooth, dull greenish yellow, pulp copious, stone under 1 in., ovoid-

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* From the very strong resemblance of the fruit of *E. serratus* to the olive.

oblong, pointed, thick, bony, strongly tubercled, 1-celled, 1-seeded.

[Var. β. *cuneatus*, Wight, Ill. i. 83 (sp.), stone 3-celled.]

Low country in the moist region up to 2000 ft.; common. Fl. Jan. and July, August; white.

Throughout the Indian and Malay Peninsulas and in Java.

Wight gives Ceylon as a locality for his *E. cuneatus*, and in Fl. B. Ind. i. 402, where it is maintained as a separate species, all the Ceylon *E. serratus* is apparently referred to it. But the common Weralu is the basis of Linnæus' species, and the stone is invariably 1-celled.

When the leaves are nearly entire (as is often the case), it is *E. integrifolius*, Lam. Ill. t. 459.

The fruit is generally known as 'wild olives' by the English, and is eaten, the pulp being pleasantly subacid and palatable. Wood light, open, yellowish-white.

[*E. robustus*, Roxb., is given for Ceylon in Fl. B. Ind. i. 402, I do not know on what authority. There are no specimens from here in Hb. Kew. It is figured in Wight, Ic. t. 64.]

2. **E. amœnus,** *Thw. Enum.* 32 (1858). **Titta-weralu,** *S.*
C. P. 2651, 2587, 2524 (?), 3906.
Fl. B. Ind. i. 404. Bedd. Fl. Sylv. t. 111.

A moderate-sized, much-branched tree, young parts finely appressed-puberulous; l. variable, 2–4 in., oblong-oval or oval, usually tapering at both ends, slightly acuminate, obtuse, crenate-serrate, glabrous, rather thick, veins prominent beneath, with glandular pits in their axils, petiole 1 in.; fl. drooping, in short, spreading racemes from the axils of past leaves below the new growth, ped. longer than sep., buds nearly globular; sep. $\frac{1}{6}$ in., lanceolate, acute, pilose, red; pet. a little longer than sep., cuneate, more or less deeply cut into linear laciniæ; stam. 18–30, pilose, fil. as long as beardless anth.; ov. and disk pilose; drupe nearly globular, $\frac{3}{4}$–$1\frac{1}{4}$ in., smooth, stone spherical, deeply tubercled, with 3 vertical grooves, 1-celled.

Moist country at elevations of 2–5000 ft.; rather common. Dickoya; Hewahette; Hantane; Dolosbagie; Dimbula; Rambodde. Fl. Sept., October, March, and April; white.

Said in Fl. B. Ind. to occur also in S. India.

Probably more than one species is here included, but I cannot separate them. C. P. 3906 from Dickoya is a form with considerably smaller fruit. C P. 2587 from Dimbula has broader leaves and wider sepals than the type, very large fruit, and quite differently shaped petals.

C. P. 2524 from N. Eliya is thought by Thwaites to be perhaps a different species. It has smaller flowers, more coriaceous, very obtuse leaves, and approaches *E. montanus*. I have also collected it in Rangala.

The rather ornamental bony stones of the fruit are said to be exported to India as beads for necklaces.

3. **E. obovatus,** *Arn. in Nov. Act. Nat. Cur.* xviii. 323 (1836).
E. coriaceus, Hk. in Wight, Ill. i. 83. Thw. Enum. 32. C. P. 316.
Fl. B. Ind. i. 404. Hook. Ic. Pl. t. 154 (*E. coriaceus*).

A small tree, young branches stout, prominently marked with leaf-scars; l. crowded, 1–3 in., obovate-oval, obtuse or acute at base, rounded at apex, shallowly mucronate-serrate, very coriaceous, glabrous, veins strongly marked, reticulate, petiole very short, stout; fl. large, $\frac{3}{4}$–1 in. diam., drooping, on long pilose ped. thickened upwards, often whorled, in racemes from the axils of upper l. and much exceeding them, bracts sharply toothed, buds bluntly pointed; sep. $\frac{1}{3}$ in., lanceolate-linear, acute, pilose, red; pet. exceeding sep., oval, cut about $\frac{1}{3}$ down; stam. 25–30, fil. as long as beardless anth., drupe nearly spherical, about 1 in., stone rugose and tubercled.

Upper montane zone; rare. Pedurutalagala; Nuwara Eliya. Fl. Feb.; white.
Endemic.

4. **E. montanus,** *Thw. Enum.* 32 (1858).
C. P. 624.
Fl. B. Ind. i. 404.

A moderate-sized tree, young parts pubescent; l. $1\frac{1}{2}$–$3\frac{1}{2}$ in., broadly oval or rotundate, rounded at base, very obtuse, denticulate, the margin usually revolute, glabrous above, glandular-pubescent, becoming glabrous beneath, coriaceous, veins very prominent beneath, with large glandular pits in their axils, petiole under $\frac{1}{2}$ in.; fl. $\frac{3}{8}$ in. diam., on short tomentose ped., in axillary racemes a little shorter than the l., buds ovoid; sep. narrow, acute, tomentose; pet. longer than sep., cuneate, cut $\frac{1}{2}$ way down, hairy on both sides, anth. beardless; fr. nearly globular, about 1 in.

Upper montane zone; very rare. Nuwara Eliya (Gardner); Hakgala (Nock). Fl. April, September.
Endemic.
I have not met with this species.

5. **E. subvillosus,** *Arn. in Nov. Act. Nat. Cur.* xviii. 323 (1836).
Gal-weralu, *S.*
Thw. Enum. 33. C. P. 704.
Fl. B. Ind. i. 404. Hook. Ic. Pl. t. 155 (*E. pubescens*).

A tree, young parts finely tomentose; l. 3–5 in., oval, narrowed or rounded at base, obtuse or very shortly acuminate, shallowly spinous-serrate, glabrous above (when mature), more or less tomentose or pubescent beneath and on margin, petiole 1–$1\frac{1}{2}$ in., tomentose, stip. very small, subulate, persistent; fl. rather large, about $\frac{3}{4}$ in. diam., on

short thick tomentose ped. in long racemes from axils of fallen l. below the new growth, bracts serrate, silky; sep. $\frac{1}{4}$ in., densely fulvous-tomentose; pet. twice as long, cut $\frac{1}{3}$ down; stam. 15–20, pubescent, anth. beardless; fr. subglobular or ovoid, 1–1$\frac{1}{4}$ in., apiculate, at first densely covered with fulvous tomentum, stone pointed, 3-grooved, tuberculated.

Moist low country extending into the montane zone to 4000 ft.; rather common. Pasdun Korale; Adam's Peak; Ambagamuwa; Hunasgiria. Fl. Feb.–April; white.

Also at Malacca and in Borneo.

6. **E. zeylanicus,** *Mast. in Fl. B. Ind.* i. 406 (1874).

Monocera zeylanica, Arn. Pug. 5. *M. Walkerii*, Wight, Ill. i. 84. Thw. Enum. 33. C. P. 8, 166.

Fl. B. Ind. i. 406.

A tree, young parts glabrous; l. 2–3 in., ovate, acute or obtuse at base, acuminate, shallowly serrate-crenate or nearly entire, glabrous, veins prominent beneath, with or without glandular pits in their axils, petiole $\frac{3}{4}$ in.; fl. $\frac{5}{8}$ in. diam., on long drooping ped. in corymbose racemes from axils of l. of past year and about as long, bracts deciduous, buds ovoid-oblong, pointed; sep. $\frac{3}{8}$ in., oblong-linear, acute, glabrous; pet. equalling sep., cuneate-oblong, silky on both sides, cut about $\frac{1}{4}$ way down; stam. 30, anth. linear, almost sessile, pilose, one valve produced into an erect beak; ov. silky, 2-celled; fr. $\frac{3}{5}$ in., oblong-ovoid, blunt, smooth, polished, greenish-white, stone 2-edged, muriculate, 1-seeded.

Montane zone; very rare. Adam's Peak, at about 5000 ft. Fl. March; white.

Endemic.

7. **E. glandulifer,** *Mast. in Fl. B. Ind.* i. 406 (1874).

Monocera glandulifera, Hk. in Wight, Ill. i. 84. Thw. Enum. 33. C. P. 675.

Fl. B. Ind. i. 406.

A large, much-branched, graceful tree, young parts glabrous; l. 3–5 in., lanceolate, acute at base, tapering to attenuate obtuse apex, more or less coarsely crenate-serrate, undulate, coriaceous, pale beneath, with prominent oblique veins and very large glandular pits in their axils, petiole very long, 1$\frac{1}{4}$–2 in.; fl. $\frac{1}{2}$ in. diam., on long, drooping, slender ped. in axillary racemes at end of branches shorter than l. and forming an apparently terminal inflor., buds oblong, pointed; sep. $\frac{1}{3}$ in., acute, pilose; pet. equalling sep., hairy on both sides, cuneate-oblong, cut about $\frac{1}{4}$ way down; stam. 30, fil. short, anth. narrowly linear, pilose, with one valve produced into a

long somewhat recurved bristle; ov. 2- or 3-celled, silky; fr. $\frac{1}{2}$–$\frac{5}{8}$ in., ovoid, smooth, glaucous; stone thick, 1-seeded.

Montane zone from about 3000–6000 ft.; common. Haputale; Ambagamuwa; Ramboda; Hantane; Maturata; Atampitiya; Hakgala, &c. Fl. Jan.–March and Sept.; white.

Endemic.

There are specimens in Mus. Brit. collected by Moon in 1819.

The glandular pits in the leaf-axils are often very large, and even perforate the leaves, but do not differ in character from the smaller ones in other species.

XXV.—LINACEÆ.

HERBS, shrubs or trees; l. alternate, simple, with or without stip.; fl. regular, bisexual; sep. 5, distinct or connate; pet. 5, distinct, contorted or imbricate; stam. 5 or 10, fil. more or less connate; ov. 3- or 5-celled, with 1 or 2 ovules in each cell, styles distinct or slightly connate; fruit a few- or 1-seeded capsule or drupe; seed with a flat embryo and scanty endosperm.

Annual herb. Pet. contorted . . . . . 1. LINUM.
Climbing shrubs. Pet. contorted . . . . 2. HUGONIA.
Shrubs or trees. Pet. imbricate (*Erythroxyleæ*) . 3. ERYTHROXYLON.

Linum is a montane plant, and *Erythroxylon obtusifolium* and *E. lanceolatum* also occur in the lower hills; the rest are low-country plants.

1. **LINUM**, *L.*

Herbs; sep. 5, distinct; pet. 5, distinct, contorted; stam. 5, connate below; ov. 5-celled, with 2 ovules in each cell, styles 5; fruit a 5-celled capsule, splitting septicidally and again loculicidally; seeds with a straight, flat embryo, in scanty endosperm.—Sp. 80; 4 in *Fl. B. Ind.*

L. mysorense, *Heyne in Wall. Cat.* n. 1507 (1828).
Thw. Enum. 25. C. P. 3127.
Fl. B. Ind. i. 411.

An annual herb, 1–2 ft., stem slender, erect, glabrous, striate, much branched corymbosely above; l. $\frac{3}{4}$ in., becoming smaller upward, sessile, linear-strap-shaped, tapering to base, acute, glabrous, 3-veined; fl. $\frac{1}{3}$ in. diam., numerous, on short curved ped., solitary, leaf-opposed, collectively forming a corymbose, terminal panicle made up of unilateral cymes;

sep. lanceolate, acute, glabrous, with membranous margins, 3-veined; pet. slightly longer than sep., rotundate; stam. with fil. dilated and connate below; no staminodes; style very slightly connate below, stigmas globose; capsule globose, apiculate, surrounded by persistent sep., splitting into 10 valves; seeds 10, oval, compressed, smooth.

Montane zone from 4000–6000 ft., on the patanas; rare. Abundant between Hakgala and Wilson's Bungalow, and about Sita Eliya. Fl. March and April; pale yellow.

Also in the W. Himalayas and the hills of the Indian Peninsula.

2. **HUGONIA,** *L.*

Shrubs, climbing by circinate peduncles; fl. axillary; sep. 5, distinct, unequal, imbricate; pet. 5, distinct, contorted; stam. 10, fil. connate at base; ov. 5-celled, with 2 ovules in each cell, styles 5, distinct; fruit a drupe, stone 10-celled, 1–5-seeded; seeds pendulous, embryo flat, endosperm scanty. —Sp. 6; 2 in *Fl. B. Ind.*

L. glabrous . . . . 1. H. MYSTAX.
L. densely silky beneath . . . . . . 2. H. FERRUGINEA.

The circinate spines are evidently modified peduncles and occasionally bear flowers.

1. **H. Mystax,*** *L. Sp. Pl.* 677 (1753). **Maha-gétiya, Bu-gétiya,** *S.* **Motirakanni,** *T.*

Herm. Mus. 9. Burm. Thes. 57. Fl. Zeyl. n. 249 (part). Moon Cat. 49. Thw. Enum. 25. C. P. 1185.

Fl. B. Ind. i. 413. Wight, Ill. t. 32.

A scrambling shrub, with wide-spreading, yellow-tomentose branches set with short, horizontal twigs leafless below and provided at the end with a pair of nearly opposite, woody, reflexed, circinate, tapering, tomentose spines in the axils of the two lowest l. or scales; l. alternate, on the main branches distant, on the lateral twigs crowded at their ends, 1–4 in., variable, oval or oblong-oval or obovate-oval, tapering to base, obtuse, entire or somewhat dentate, glabrous, thin, with reticulate venation prominent on both sides, petiole very short, stip. conspicuous, setaceous, persistent; fl. rather large, 1–1¼ in., on woolly ped. as long as sep., in axils of the crowded l. at end of twigs; outer sep. lanceolate-oblong, tomentose, obtuse; pet. many times longer than sep., oblong-oval, acute or truncate; styles longer than stam., stigmas capitate; drupe

* From the resemblance of the curved woody tendrils to a pair of moustaches.

nearly globose, ½ in., supported on persistent sep., pulp scanty, stone bony, grooved, 10-celled, with usually 2 or 3 seeds.

Low country, especially in the dry region; rather common. Jaffna (Gardner); Kurunegala; Doluwe Kande; Hambantota; Galle. Fl. May–Aug.; yellow. Fruit scarlet.

Also on the west coast of Peninsular India.

There are specimens collected by Jonville in 1800, in Hb. Mus. Brit.

Some of Hermann's specimens are *Ancistrocladus Vahlii* (q. v.). *H. villosa*, Moon Cat. 49, appears to be a mere variety, judging from a drawing so named in Herb. Perad.

2. **H. ferruginea,** *W. and A. Prod.* 72 (1834).
Thw. Enum. 25. C. P. 1184.
Fl. B. Ind. i. 413.

A sarmentose scrambling shrub, shoots and young parts densely covered with orange tomentum, spines as in *H. Mystax;* l. 2–3 in., ovate, shortly acuminate, entire or faintly toothed, finely golden-silky, ultimately glabrous above, densely golden-silky beneath, lat. veins prominent, arched, not reticulate, bracts subulate; fl. 2 or 3 together, on short ped. from leaf-axils, buds pointed; sep. ovate, acuminate, densely tomentose, pet. about twice as long; fruit not seen.

Moist low country; rare. Kalutara (Moon); Galle; Heneratgoda. I do not know whence Wight's specimens (n. 286, collected by Col. Walker in March, 1836) were obtained. Fl. Dec.; yellow.

Endemic.

I have not met with this living, and the dried specimens are not very good.

3. ERYTHROXYLON, *L.*

Trees or shrubs, glabrous; l. entire, with combined, intrapetiolar stip.; fl. axillary, heterostyled; sep. 5, slightly connate below; pet. 5, distinct, imbricate, spreading, with a large double erect scale on the inner surface; stam. 10, fil. connate into a tube; ov. 3-celled, with 1 ovule in each cell; styles 3, nearly free or connate; stigmas capitate; fruit a drupe, stone 1–3-celled, 1-seeded.—Sp. 50; 6 in *Fl. B. Ind.*

Tree; stip. persistent . . . . 1. E. MONOGYNUM.
Shrubs; stip. caducous.
  Leaves tapering to apex; styles connate.
    Lat. veins horizontal . . . . . . 2. E. LUCIDUM.
    Lat. veins oblique . . . . 3. E. LANCEOLATUM.
  Leaves rounded at apex; styles free . . . 4. E. OBTUSIFOLIUM.

1. **E. monogynum,** *Roxb. Cor. Pl.* i. 61 (1795). **Devadaram, Chemmanatti,** *T.*
Moon Cat. 36. *Sethia indica*, DC., Thw. Enum. 53. C. P. 1168.
Fl. B. Ind. i. 414. Wight, Ill. t. 48, copied in Bedd. Fl. Sylv. t. 81 (*E. indicum*).

A tree, usually small, much branched, bark dark brown, thick, very rough; l. $1\frac{1}{2}$–$2\frac{1}{2}$ in., shortly stalked, oval-obovate, tapering to base, very obtuse, thin, paler beneath, veins reticulate, combined stip. triangular, persistent; fl. $\frac{1}{4}$ in., on slender ped. very much shorter than l., 1–4 together, axillary; sep. triangular, acute, glabrous; pet. much longer than sep., spreading; styles connate for nearly whole length; drupe $\frac{3}{8}$ in., oblong, apiculate, somewhat trigonous, smooth, bright scarlet, surrounded at base by persistent sep. and stam., stone thin, 3-celled.

Dry country; very common. Fl. August, &c.; greenish-white. Fruit scarlet.

Also in Southern India.

There are specimens from Koenig in Brit. Mus.

Heart-wood very hard, heavy, smooth, dark brown. It has a pleasant resinous scent, and yields, by distillation, a kind of tar, said by Dr. Ondaatje (Obs. Veg. Prod. (1853) 13) to be used by the Moormen at Puttalam as a preservative for the wood of their boats. The leaves contain an alkaloid, which is bitter and astringent, but it has none of the properties of Cocaine, the alkaloid of *E. Coca* of Peru.

2. **E. lucidum,** *Moon Cat.* 36 (1824). **Bata-kirilla,** *S.* **Chiruchemannatti,** *T.*

Sethia acuminata, Arn. Pug. 6; Wight, Ill. t. 35; Thw. Enum. 54. C. P. 222, 3488, 4011.

Fl. B. Ind. i. 415.

A much-branched, twiggy shrub, with pale bark; l. $1\frac{1}{2}$–3 in., linear-lanceolate to oval-lanceolate, acute or rounded at base, tapering, acuminate with obtuse apex, shining on both surfaces, lat. veins horizontal, petiole very short, stip. caducous; fl. solitary, axillary, ped. much longer than petiole; sep. lanceolate, acute; pet. oblong, obtuse; styles connate nearly to apex; drupe $\frac{1}{2}$ in., pointed, grooved.

Low country; rather common. Ratnapura; Ambagamuwa; Kuruwita Korale; Singhe Raja Forest; and (in dry region) Uma Oya; Nilgala; Dambulla. Occurs as an undergrowth in forests. Fl. March–May; greenish-yellow.

Endemic (?): perhaps in Borneo.

C. P. 3488 (from Singhe Raja) is Thwaites's var. β.; it has smaller and more caudate leaves than the type. C. P. 4011 (from Dambulla) has the leaves abruptly narrowed at the base, as is the case generally in the dry country.

The juice of the leaves is a valuable anthelmintic and much used, especially for children.

3. **E. lanceolatum,** *Hk. f. Fl. B. Ind.* i. 415 (1874).

Sethia lanceolata, Wight, Thw. Enum. 54. C. P. 493.

Fl. B. Ind. i. 415.

An erect, branched shrub; l. $2\frac{1}{2}$–4 in., narrowly lanceolate, tapering at both ends, obtuse, shining above, midrib very prominent beneath, lat. veins somewhat oblique, petiole very short, stip. caducous; fl. solitary, axillary; styles united for $\frac{2}{3}$ of their length; drupe not seen.

Lower montane zone; rare. Galagama, on the banks of streams; Raxawa. Fl. Feb.

Also at Courtallum in S. India.

I have very insufficient material for this species, which seems scarcely separable from *E. lucidum.*

4. **E. obtusifolium,** *Hk. f. Fl. B. Ind.* i. 415 (1874).
Sethia obtusifolia, Thw. Enum. 54. C. P. 25, 2613.
Fl. B. Ind. i. 415.

A much-branched shrub, twigs angular; l. variable, $1\frac{1}{2}$–4 in., oblong-lanceolate or oblong-oval or oval, tapering to short petiole, rounded or obtuse or retuse at apex, rather thick, paler beneath, shining on both surfaces, lat. veins prominent beneath, slightly oblique, stip. caducous, leaving conspicuous scars; fl. nearly $\frac{1}{2}$ in., solitary, axillary, ped. $\frac{1}{4}$–$\frac{1}{2}$ in., stiff, thickened upwards; pet. obtuse; styles nearly free; drupe $\frac{1}{2}$ in., scarlet.

Lower montane zone; rather common, up to 4000 ft. Dimbula; Ambagamuwa; Hunasgiria; Hantane; Ritigala, N.C. Prov. (2500 ft.) abundant; Fl. March–May; greenish-white. Fruit scarlet.

Endemic.

Scarcely a distinct species from *E. lucidum* and *E. lanceolatum*, but the flowers are larger and the styles almost entirely distinct.

XXVI.—MALPIGHIACEÆ.*

CLIMBING shrubs; l. opposite, entire, without stip.; fl. slightly irregular, bisexual, in racemes; sep. 5, connate at base; pet. 5, distinct, clawed, imbricate, the uppermost larger; stam. 10, distinct, declinate, 1 much longer than the rest; ov. 3-celled, with 1 ovule in each cell; fruit of 1–3, dry, indehiscent, winged, 1-seeded nuts; seed without endosperm.

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* A very large Order, mainly American, and sparingly represented in the Old World.

HIPTAGE, *Gaertn.*

For characters, see *Order.*—Sp. 5 ; all in *Fl. B. Ind.*

L. 4–7 in. long . . . . 1. H. MADABLOTA.
L. 2–4 in. long . . . . 2. H. PARVIFOLIA.

1. **H. Madablota,*** *Gaertn. Fruct.* ii. 169 (1791). **Puwak-gédi-ya-wel,** *S.*

Fl. Zeyl. n. 176. *Bannisteria bengalensis*, L Sp. Pl. 427. *Gaertnera racemosa*, Roxb., Moon Cat. 34. Thw. Enum. 53. C. P. 659.

Fl. B. Ind. i. 418. Wight, Ill. t. 50.

A large woody climber, stems stout, cylindrical, much branched, young parts silky ; l. 4–7 in., opposite, oval or lanceolate, acute at base, acuminate, acute, entire, glabrous, thick, paler beneath with prominent veins, petiole very short, thick, sparingly silky ; fl. rather large, $\frac{3}{4}$ in. diam., on long, 2-bracteolate ped., arranged in erect, axillary, finely tomentose racemes about as long as l. ; sep. oblong, obtuse, densely pubescent, persistent, one with a large oblong gland at the base outside ; pet. twice as long as sep., rotundate, clawed, pubescent, strongly ciliate, the uppermost broader than the rest ; stam. exserted, curved, declinate, one much longer than the rest ; style hooked at end, longer than stam. ; nut (usually only a single carpel developed) with a flat top, on which is a short, triangular wing or crest, pilose, provided with 3 lateral, spreading, horizontal, oblong, obtuse wings, the middle one $1\frac{1}{2}$ in. and two lateral about $\frac{3}{4}$ in. long ; seed solitary, globose.

Low country ; common in both moist and dry regions. Fl. March ; white, the back petal stained with yellow.

Also in India, Burma, Malay Peninsula, Java, and China.

There is a specimen in Herb. Hermann, but he does not give it any name.

2. **H. parvifolia,** *W. and A. Prod.* 107 (1834).

Thw. Enum. 53. C. P. 1166.

Fl. B. Ind. i. 419.

A woody climber, young parts silky ; l. 2–4 in., lanceolate, acute at both ends, entire, glabrous, shining above ; fl. smaller than in the last, on very long ped., in axillary and terminal racemes ; nuts (often 2 or all three developed) without any wing or crest on top, each provided with 3 spreading, horizontal wings, the middle one about 1 in. long and erose-bifid at apex, the two lateral $\frac{1}{2}$–$\frac{3}{4}$ in., acute.

Dry region ; rare. Jaffna (Gardner) ; Dambulla. Fl. March.

Also in Southern India.

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* Madablota is given as a native name for this by Sonnerat in his *Voyage to the E. Indies* (1782).

Smaller in all its parts than *H. Madoblota*, and with quite different wings to the carpels.

Tristillatcia australasica, A. Rich. This, under the name of *Platynema laurifolium*, is recorded by W. and A. (Prod. 107) as from Ceylon. According to Fl. B. Ind. i. 418 the specimens were from Singapore, where it is a common plant, both wild and cultivated.

XXVII.—ZYGOPHYLLACEÆ.

HERBS; l. opposite, pinnate, with stip.; fl. regular, bisexual; sep. and pet. 5, distinct, imbricate; stam. 10, distinct, alternate ones (opp. pet.) longer; disk annular, 10-lobed; ov. 5-celled, with several superposed ovules in each cell, styles combined; fruit of distinct, indehiscent cocci, each with several seeds; seed with green embryo, no endosperm.

TRIBULUS, *L.*

For characters, see Order.—Sp. 15; 3 in *Fl. B. Ind.*

T. terrestris, *L. Sp. Pl.* 387 (1753). **Sembu-nerinchi,** *S.* **Chiru-neriñchi,** *T.*

Herm. Mus. 44. Burm. Thes. 226. Fl. Zeyl. n. 168. *T. lanuginosus.* L. Sp. Pl. 387; Moon Cat. 35. Thw. Enum. 68. C. P. 1252.
Fl. B. Ind. i. 423. Wight, Ic. t. 98. Burm. Thes. t. 106, f. 1.

Annual, with numerous, long, prostrate, more or less hairy or hispid branches; l. opposite (the pair usually unequal), pinnate, with 3–6 pair of opposite, nearly sessile lflts., lflts. $\frac{1}{8}$–$\frac{1}{2}$ in., oblong, apiculate, white and silky beneath, slightly silky above, stip. lanceolate, acute; fl. $\frac{1}{2}$–$\frac{3}{4}$ in. diam., solitary, axillary or leaf-opposed, ped. slender, shorter than l.; sep. linear, acute; pet. rounded, longer than sep., fugacious; ov. bristly, style short, stout; fr. of (usually) 5, hairy or nearly glabrous, woody cocci, each with 2 pair of stiff sharp spines one pair longer than the other, often muriculate, together forming a more or less spherical spiny ball; seeds several in each coccus, with transverse partitions between them.

Low country; very common in sandy ground, especially in the dry region. Fl. all the year; bright yellow.

Distributed throughout the warmer countries of the world.

A very variable plant. Linnæus distinguished his *T. lanuginosus* (the Ceylon plant) by having 5 (instead of 6) pairs of leaflets.

XXVIII.—GERANIACEÆ.

HERBS, or semi-shrubby; l. alternate or opposite, simple or compound, usually stipulate; fl. bisexual, regular or irregular; sep. 5 or 3, distinct, equal or unequal, imbricate, 1 often spurred; pet. 5 (or apparently 3), distinct or connate, equal or unequal, imbricate; stam. 5 or 10, fil. distinct or connate, anth. distinct or coherent; ov. 5-celled, with few or many ovules in each cell; styles distinct or 0; fruit either distinct 1-seeded cocci, or a 5-celled capsule, or a drupe with a 5-celled stone; seeds with or without an aril, endosperm scanty or 0.

Fls. regular.
  Pet. imbricate; fruit of 5 cocci . . . . . . 1. GERANIUM.
  Pet. contorted; fruit a capsule (*Oxalideæ*).
    L. trifoliolate . . . . 2. OXALIS.
    L. pinnate . . . . 3. BIOPHYTUM.
Fls. irregular (*Balsamineæ*).
    Lat. pet. connate; fruit a capsule . . . . 4. IMPATIENS.
    Lat. pet. distinct; fruit a drupe . . . . 5. HYDROCERA.

Our species are mostly montane:—*Geranium*, 3 species of *Biophytum* and 17 of *Impatiens*. Of these, 4 or 5 *Impatiens* also extend downwards into the low country, to which are confined 2 species of *Biophytum*, 4 species of *Impatiens* and *Hydrocera*. *Oxalis corniculata* is a universal weed; it occurs even in Britain; and *Geranium* and *Impatiens* are also British genera.

1. GERANIUM, *L.*

Herbs; l. opp., stipulate; fl. regular, axillary; sep. 5, imbricate; pet. 5, imbricate; stam. 10, distinct; ov. with a long beak, 5-celled, with 2 or 3 superposed ovules in each cell, styles 5; fr. dry, separating into 5 one-seeded cocci, each with a long beak which curls upwards elastically, remaining attached to apex of the axis; cotyledons leafy, endosperm very scanty.—Sp. 100; 18 in *Fl. B. Ind.*

G. nepalense, *Sweet. Ger.* t. 12 (1820).
Thw. Enum. 64. C. P. 2788.
Fl. B. Ind. i. 431. Wight, Ill. t. 59 (*G. affine*, W. and A.).

A perennial herb, with a woody rootstock and numerous long, ascending, diffuse, much-branched, pilose stems; l. opposite, roundish in outline, 1–1½ in., very deeply divided

into 5 wedge-shaped segments, which are again deeply cut and serrated, hairy on both sides, teeth cuspidate, petiole of lower l. very long (often 6 in.), of upper l. shorter or very short, hairy, stip. subulate-lanceolate, persistent; fl. about ½ in. diam., solitary or rarely 2 together, on long, slender, hairy, axillary ped., which are bi-bracteolate and jointed above the middle; sep. oblong-lanceolate, strongly cuspidate or awned, hairy; pet. rounded, clawed, rather longer than sep.; stam. with fil. dilated below; cocci ovoid, pointed, hairy, their beaks ½ in., hairy; seed oblong-ovoid, finely striate, black.

Upper montane zone; very rare. The C. P. specimens are from between Nuwara Eliya and Maturata at 7000 ft. First collected by Col. Walker. Fl. Aug.; pink (?).

Also in the mountains of Southern India, and throughout the Temperate Himalayas.

I have not met with this species. In Wight's figure above quoted the flowers are coloured yellow.

2. OXALIS, *L.*

Herbs; l. alternate, trifoliolate, stipulate; fl. regular, axillary; sep. 5, imbricate; pet. 5, contorted, very slightly coherent at base; stam. 10, connate at base, 5 inner longer; ov. 5-celled; styles 5; fruit a 5-celled, loculicidal capsule; seeds numerous, with an elastic, dehiscent aril, embryo in endosperm.—Sp. 200; 3 in *Fl. B. Ind.*

O. corniculata, *L. Sp. Pl.* 435 (1753). **Hin-embul-embiliya,** *S.*
Herm. Mus. 60. Burm. Thes. 179. Fl. Zeyl. n. 499. Moon Cat. 36. Thw. Enum. 64. C. P. 1188, 1189.
Fl. B. Ind. i. 436. Wight, Ic. t. 18 (*O. repens*).

A perennial herb, with very long, slender, creeping or subterranean stems, rooting at the nodes and giving off long, ascending, slender, much-branched, pilose branches, roots often somewhat tuberous or swollen; l. alt., trifoliolate, on very long, slender, hairy petioles, lflts. over ½ in., sessile, broadly obcordate, glabrous, ciliate, stip. small, adnate to petiole; fl. ⅜ in., in little umbels of 1–3, on erect, axillary peduncles greatly exceeding the l., ped. slender, hairy, bracts setaceous in a ring below ped.; sep. lanceolate, obtuse, pilose; pet. exceeding sep., rounded, long-clawed; ov. oblong, stigmas papillose; capsule ¾ in. or more, linear-oblong, 5-angled, with a short beak, pubescent; seeds surrounded by a white fleshy aril which bursts elastically, testa strongly transversely ridged, brown.

Extremely common throughout the island, especially in cultivated land. Fl. throughout the year; yellow.

Found in all Tropical and Temperate countries.

One of our commonest weeds. The leaves have an acid taste.

O. violacea L. This I take to be the name of the species which has become a very troublesome weed in some parts of the hill districts in cultivated ground, increasing very rapidly by means of its numerous bulbils. It is a native of the United States, and already recorded in Moon Cat. 36.

3. BIOPHYTUM, *DC.*

Annual or perennial herbs; l. crowded at nodes and ends of stem and branches, abruptly pinnate, with a hairy rachis and opposite pairs of oblique, sessile lflts.; fl. in small, axillary, stalked umbels, with numerous, rigid, setaceous bracts; sep. 5, imbricate; pet. 5, *connate into a salver-shaped cor.;* stam. 10, distinct, 5 inner longer; ov. 5-celled, styles 5; fr. and seed as in *Oxalis.*—Sp. about 20; 8 in *Fl. B. Ind.*

The fl. are strikingly dimorphic (heterostyled).

Annual. Stem unbranched.
  Pedicels longer than sep. Seeds tuberculate . 1. B. SENSITIVUM.
  Pedicels shorter than sep. Seeds transversely ribbed . . . . 2. B. NERVIFOLIUM.
Perennial. Stems proliferously branched.
  Peduncles longer than leaves; lflts. glaucous beneath . . . . 3. B. NUDUM.
  Peduncles shorter than leaves; lflts. not glaucous.
    Stems erect; leaves 2–4 in. . . . . 4. B. INTERMEDIUM.
    Stems prostrate; leaves under 1 in. . . 5. B. PROLIFERUM.

Thwaites (Enum. 409) combines all these under one species, *Oxalis sensitiva*, L.

1. **B. sensitivum,** *DC. Prod.* i. 690 (1824). **Gas-nidikumba,** *S.*
Herm. Mus. 5. Burm. Thes. 178. Fl. Zeyl. n. 180. *Oxalis sensitiva,* L. Sp. Pl. 434; Moon Cat. 36; Thw. Enum. 64, 409. C. P. 1190.
Fl. B. Ind. i. 436. Bot. Reg. xxxi. t. 68.

An annual, stem short, erect, 1–2 in. high, perfectly simple, glabrous or hairy, red; l. crowded into a rosette at top of stem, spreading, 1½–3 in., petiole short, lflts. in 10–16 pairs (rarely fewer), the lower ones much the smaller, terminal pair largest, ⅜ in. long, oblong, truncate or subcordate at base, apiculate, glabrous, paler beneath; fl. ⅓ in., numerous in the umbel, peduncles erect, slightly exceeding l., stiff, glandular-pubescent, ped. slender, spreading, a little longer than sep., bracts very small, numerous, crowded; sep. linear-lanceolate, acute, 3–5-veined, glandular-hairy; cor.-tube much exceeding sep., lobes rounded, spreading; styles nearly glabrous; capsule globular-ovoid, very slightly exceeding sep., apiculate, valves

flat and spreading after dehiscence; seeds strongly tuberculate.

Low country, on banks by roadsides and as a weed; very common. Fl. throughout the year; golden-yellow with red veins.

Throughout the Tropics.

I cannot distinguish *B. Reinwardtii*, Hk. f., given for Ceylon in Fl. B. Ind. i. 437, from the above. It is said to differ in its more slender habit and smaller flowers, and the old figure in Hort. Malab. ix. t. 19 is quoted for it. Specimens from Mrs. Walker (Hb. Kew) and from Fraser (Mus. Brit.) appear to satisfy these characters, which are scarcely sufficient for specific difference. Part of C. P. 2787 ought perhaps to be referred to this.

2. **B. nervifolium,** *Thw. Enum.* 64 (1858).
C. P. 2787 (part).

Annual, with a very short, erect, unbranched stem; l. numerous, forming a crowded rosette almost on the ground, $1\frac{1}{2}$–4 in., lflts. 8–14 (usually 12) pair, generally overlapping, broadly oblong, apiculate, glabrous, paler beneath, with the lat. veins very prominent, terminal ones the largest; fl. $\frac{3}{8}$ in., umbels dense, crowded, ped. shorter than sep., bracts hairy, peduncles stiff, with adpressed hairs, longer or shorter than l.; sep. long, lanceolate-linear, attenuate, very acute, with 7 prominent parallel veins; pet. much exceeding sep.; styles hairy; capsule ovoid, shorter than sep.; seeds strongly, transversely (? spirally) ribbed, not tubercled.

Sandy ground in the dry region; rather common. Jaffna; Puttalam; Chilaw; Anuradhapura; Batticaloa. Fl. Dec.–March; orange, brownish or pale-pink.

Endemic (?)

This is reduced to *B. sensitivum* in Fl. B. Ind., but the dwarf habit, long narrow sepals, and very different seeds seem to easily distinguish it, as well as the different colour of the flowers. It is strictly confined to the dry region.

[*B. Candolleanum*, Wight, figured in Wight, Ill. t. 62, is given in Fl. B. Ind. i. 437 for Ceylon. It is a Nilgiri montane plant, and I have seen nothing like it here. I doubt if it can be referred to *B. sensitivum* as in Fl. B. Ind.]

3. **B. nudum,** *Wight, Ill.* i. 161 (1840).
Oxalis nuda, Arn. Pug. 8. Thw. Enum. 64, 409. C. P. 464.
Fl. B. Ind. i. 438.

Perennial, semi-woody, stem 6 in.–2 ft., erect, simple or with whorled branches, pilose or nearly glabrous; l. $1\frac{1}{2}$–$3\frac{1}{2}$ in., lflts. 10–20 pair, oblong, truncate at base, slightly falcate, strongly cuspidate, faintly hairy, glaucous or whitish beneath with prominent veins, lower ones smaller; fl. few, umbels small, ped. slender, about as long as sep., hairy, bracts very numerous, lanceolate, crowded, peduncles exceeding the l.,

adpressed-hairy; sep. lanceolate, acute, mucronate, nearly glabrous, veined; capsule ovoid, blunt, about equalling sep.; seeds not furrowed, slightly tuberculated.

Montane zone from 4000 to 6000 ft. in wet forest; rather common. Adam's Peak; Maskeliya; Nillembe; Rambodde; Knuckles; Rangala; Ambawella. One specimen in Hb. Perad. is labelled by Thwaites 'Pasdun Korale,' probably by error. Fl. March, April, and September; yellow.

Endemic.

There is a specimen from Moon in the Brit. Mus.

B. intermedium, *Wight, Ill.* i. 162 (1840). [PLATE XXI.]
B. proliferum, var. β. Thw. Enum. 64, 409. C. P. 2419.
Fl. B. Ind. i. 438.

Perennial, semi-woody at base, 2–4 ft., erect, with many dichotomous or whorled branches, pubescent, with a ring of stiff, reflexed hairs at the nodes; l. 2–4 in., lflts. 15–25 pair, lowest the smallest, scarcely overlapping, oblong, truncate at base, very obliquely apiculate, somewhat falcate, glabrous, midrib curved at apex, lat. veins fine, numerous, oblique, anastomosing; fl. large, over $\frac{1}{2}$ in. diam., 4–8 in the umbel, ped. 3 times as long as sep., bracts subulate, peduncles slender, shorter than l., strongly pubescent; capsule as long as sep.; seeds tuberculated.

Montane zone at 4000–6000 ft.; rare. Raxawa (Gardner); Dolosbagie; Uda Pusselawe; Lunugala, Uva. Fl. Feb., April, June; yellow.

Also in the mountains of Southern India (?).

5. **B. proliferum,** *Wight, Ill.* i. 162 (1840).
Oxalis prolifera, Arn. Pug. 9. Thw. Enum. 64, 409. C. P. 2418.
Fl. B. Ind. i. 438.

Perennial, with numerous prostrate or ascending, filiform stems, rooting at the thickened nodes, with very numerous dichotomous or whorled branches, pubescent or hairy, with tufts of long, deflexed hair below the nodes; l. small, under 1 in., lflts. 8–15 pair, very small, crowded and often overlapping, oblong, truncate at base, obliquely apiculate, with few long bristly hairs on both sides; fl. $\frac{1}{4}$–$\frac{3}{8}$ in. diam., solitary or 2 in the umbel, ped. as long as or longer than sep., bracts setaceous, peduncle very slender, shorter than l.; sep. linear-lanceolate, attenuate, very acute, with long hairs; capsule shorter than sep., 5-angled; seeds tuberculated.

Montane zone, from 4000 ft. upwards in open sunny places, often forming large mats covering a considerable space; common. N. Eliya; Horton Plains; Hakgala; Hunasgiriya; Rangala; Haputale. Fl. all the year; yellow.

Endemic.

A very curious and pretty dwarf species, well suited for pot cultivation.

Averrhoa Carambola, L., Kamaranga, S., and *A. Bilimbi*, L., Bilin, S., are both common in gardens. There are specimens of both in Hermann's Herbarium, and they may have been introduced by the Portuguese from the New World, but they are not known anywhere in a wild state. Figured in Bedd. Fl. Sylv. t. 37 and t. 117.

4. **IMPATIENS**, *L.*

Annual or perennial herbs; fl. axillary, solitary or in racemes, or (rarely) on scapes, irregular, resupinate; sep. 3, imbricate, 2 lateral ones small, anterior one (really posterior) petaloid, here called *lip*, usually produced into a spur; pet. 3 (really 5), posterior one (really anterior) erect, here called *standard*, generally small, lateral ones (each of 2 connate) here called *wings*, generally large, 2-lobed; stam. 5, fil. short, broad, anth. coherent; ov. 5-celled, with many uniseriate ovules in each cell, stigmas sessile; fruit a fleshy, 5-valved capsule, dehiscing elastically, the valves separating from the seed-bearing axis; seeds without endosperm.—Sp. about 150; 123 in *Fl. B. Ind.*

No less than 15 of our 21 species of Balsam are endemic.

Leaves radical . . . . 1. I. ACAULIS.
Leaves opposite . . . . 2. I. OPPOSITIFOLIA.
Leaves alternate, often crowded at top of stem.
  Fl. fascicled or solitary.
    Upper lobe of wings larger than lower . 3. I. CUSPIDATA.
    Upper lobe of wings smaller than lower or nearly equal.
      Fl. fascicled.
        L. small, narrow-lanceolate or linear . 4. I. BALSAMINA.
        L. large, oval or ovate.
          Lip $\frac{3}{4}$ in. hairy, wings exserted . . 5. I. GLANDULIFERA.
          Lip $\frac{1}{2}$ in. nearly glabrous, wings included . . . . . . 6. I. MACROPHYLLA.
      Fl. solitary (rarely 2 together).
        Stem creeping, fl. yellow . . . 7. I. REPENS.
        Stem erect, fl. pink or white.
          Wings divaricate . . . . . 8. I. LEPTOPODA.
          Wings approximated.
            Lower lobe of wing much larger than upper . . . . . 9. I. TRUNCATA.
            Lobes of wing nearly equal.
              Spur $1–1\frac{1}{2}$ in., glabrous . . 10. I. FLACCIDA.
              Spur $1\frac{1}{2}–2\frac{1}{2}$ in., hairy . . 11. I. HENSLOWIANA.

Fl. in stalked racemes.
Lobes of wing nearly equal, fl. violet . . 12. I. JANTHINA.
Lobes of wing very unequal, fl. white, pink, or red.
Lip more or less boat-shaped or funnel-shaped.
Racemes few-flowered, corymbose or umbellate.
Fl. over 1 in. diam. . . . . 13. I. HOOKERIANA.
Fl. under 1 in. diam.
L. more or less cordate at base . 14. I. SUBCORDATA.
L. tapering to base
Lower lobe of wing 3-lobed . 15. I. LEUCANTHA.
Lower lobe of wing undivided.
Upper lobe of wing oblong-oval 16. I. LINEARIS.
Upper lobe of wing falcate acuminate . . . . 17. I. APPENDICULATA.
Racemes many-flowered, elongated.
Fl. rather large, spur over 1 in.. . 18. I. ELONGATA.
Fl. rather small, spur under $\frac{3}{4}$ in.
Spur stout, suddenly curled up at point . . . . . . 19. I. CORNIGERA.
Spur slender, tapering gradually . 20. I. ARNOTTII.
Lip deeply saccate . . . . . 21. I. WALKERI.

1. **I. acaulis,** *Arn. in Comp. Bot. Mag.* i. 325 (1835).
I. bulbosa, Moon Cat. 18. Thw. Enum. 68. C. P. 490.
Fl. B. Ind. i. 443. Bot. Mag. t. 3587 (*I. scapiflora*).

A perennial herb, with a small, tuberous, fleshy rootstock; l. all radical, rotundate or ovate or oval-oblong, tapering or rounded or cordate at base, acute or obtuse, slightly and distantly glandular-serrate, glabrous or with scattered papillose hairs, petiole erect, stout, glabrous, as long as the l.; fl. rather large, 1–1$\frac{1}{4}$ in. diam., on slender, straight, glabrous ped. 1–1$\frac{1}{2}$ in. long, arranged in an erect, corymbose raceme at the ends of stout, erect scapes exceeding the l., bracts short, ovate, spreading; sep. $\frac{1}{6}$ in., ovate, obtuse, lip small, boat-shaped, with a very slender, tapering, much-curved spur over 1 in. long; standard very short, wings very deeply bifid, lobes falcate, unequal, the upper one oblong, rounded, the lower one much broader, obliquely truncate; capsule $\frac{3}{4}$ in.

Lower montane zone, on wet perpendicular rocks, especially within reach of the spray of waterfalls; common. Moon's locality is the Three Korales. Fl. all the year; bright rose-pink.

Also found in Malabar.

A lovely plant, common in the planting districts.

The leaves are very variable in form and size, they are sometimes fleshy. A dwarf sub-uniflorous state with very small orbicular leaves, found on top of Rangala Hill, has the look of an *Utricularia*.

[*I. fasciculata*, Lam. is figured in Bot. Mag. t. 4631 from plants which flowered at Kew in 1851 from seeds said to have been 'sent by Mr.

Thwaites from the hilly country of Ceylon.' An error is certain, as this species does not occur here, though found in the Nilgiris.]

2. **I. oppositifolia,** *L. Sp. Pl.* 937 (1753).
Herm. Mus. 19. Fl. Zeyl. n. 314. *I. rosmarinifolia*, Retz. Obs. v. 29; Arn. l. c. 325; Thw. Enum. 65. C. P. 31.
Fl. B. Ind. i. 448. Wight, Ic. t. 883.

Annual, stems erect, 1–1½ ft., much branched, glabrous, flaccid; l. opposite (sometimes 3 or 4 in a whorl), nearly sessile, 1–3 in., linear or lanceolate-linear, acute at both ends, distantly spinous-serrate, glabrous, stip. small, acute; fl. about ½ in., usually solitary (rarely 2 or 3), axillary, on very slender, glabrous ped.; sep. very small, oval, acute, lip boat-shaped, with a very short, stout, curved spur; standard rotundate, notched; wings approximated, lower lobe much the larger, oval, obtuse, upper falcate, acute; capsule under 1 in., fusiform; seeds glabrous, black.

Wet places in all parts of Ceylon; very common. Fl. all the year; pink.
Also in S. India.
The only one of our species of *Impatiens* which extends into the dry region.

I. tenella, Heyne. Specimens from Nilavelli, near Trincomalie, sent by Mr. Ferguson in 1885, are probably this species. The upper leaves are very narrow, almost filiform, and often in whorls of 3, the sep. linear acuminate; the spur is longer than in ordinary *I. oppositifolia*, and the whole plant much more slender and delicate.

3. **I. cuspidata,** *W. and A. in Comp. Bot. Mag.* i. 321 (1835).
I. serrata, Moon Cat. 18 (probably). Thw. Enum. 65. C. P. 156.
Fl. B. Ind. i. 450 (under *I. latifolia*). Wight, Ic. t. 741.

Perennial; stem stout, 6–8 ft., somewhat woody below, slightly branched, glabrous, branches usually nodulose with prominent leaf-scars; l. alternate, usually crowded at ends of branches, 2–3½ in., narrowly lanceolate, tapering at both ends especially into petiole, closely spinous-serrate with the lower teeth filiform, glabrous, paler beneath, with the lat. veins oblique and very prominent; fl. large, 1½ in. or rather more diam., ped. long, glabrous, solitary or 2 together, from axils of upper l.; sep. lanceolate, acuminate; lip boat-shaped, acuminate; spur slender, 1–1¼ in., slightly curved; standard larger than wings, deeply bifid, with obtuse, divaricate lobes; wings deeply lobed, the upper lobe much the larger, spreading, falcate, retuse, the lower one enclosed in the lip, oblong, obtuse; capsule 1¼ in., very pointed; seeds oval, compressed, reticulate or papillose.

Var. *β*. **bipartita,** *Arn. l.c.* 322 (sp.). C. P. 503. Bot. Mag. t. 5625 (*I. latifolia*). Fl. B. Ind. i. 457 (under *I. flaccida*).

Large, 8–10 ft., much branched ; l. narrower, thicker, with more oblique veins ; spur shorter ; fl. paler in colour.

Montane zone, from 4000–7000 ft.; rather common. Above Galagama (Gardner); Adam's Peak ; Bopatalawa ; Rangala. Var. *β*. Nuwara Eliya, abundant ; Nanu-oya ; Ramboda, &c. Fl. March and April, September ; mauve-pink ; Var. *β*. pale pink or nearly white.

Also in mountains of S. India ; var. *β*. endemic.

This is referred in Fl. B. Ind. to *I. latifolia*, L. and said to have subopposite and whorled leaves. The leaves of our plant are always alternate. Linnæus' *I. latifolia* is based on Rheede's figure (Hort. Malab. ix. t. 48), which seems rather to agree with *I. flaccida* (q. v.) than with this.

Var. *β*. is a very conspicuous Balsam from Nanu-oya to Nuwara Eliya. *I. bipartita*, Arn. is given, with doubt, as a synonym of *I. flaccida* in Fl. B. Ind., but it is much better put with *I. cuspidata*, as Thwaites also has it.

4. **I. Balsamina,** *L. Sp. Pl.* 938 (1753). **Kudalu-kola,** *S.*
Thw. Enum. 65. C. P. 1213.
Fl. B. Ind. i. 453. Rheede, Hort. Malab. ix. t. 52.

Annual, erect, 1–3 ft., stem glabrous or pubescent, slightly branched ; l. alternate, obscurely petioled, $1\frac{1}{2}$–5 in., narrowly lanceolate or linear, tapering at both ends, especially at base, coarsely spinous-serrate, the lowest serratures often filiform and glandular, glabrous ; fl. rather over 1 in. diam., on slender, pubescent ped. much shorter than l., 1–3 from axils of upper l. ; sep. very small, linear, lip keeled, mucronate, hairy ; spur 1 in. or more, slender, curved, strongly pubescent ; standard small, roundish, retuse ; wings very much larger, lower lobe very large, bifid, rounded, upper lobe much smaller, obtuse, retuse ; capsule $\frac{3}{4}$ in., pointed, tomentose ; seeds globose, tubercled.

Var. *β*. **cornuta,** *Trim.* Herm. Mus. 30. Burm. Thes. Zeyl. t. 16, f. 1. Fl. Zeyl. n. 316. *I. cornuta*, L. Sp. Pl. 937.

L. broader ; fl. smaller ; spur longer, very slender.

Wet places at elevations of 2–4000 ft.; common. Fl. Sept.–Jan.; bright pink.

Found throughout India, Malaya, and China. Considered to be original of the Garden Balsam.

5. **I. glandulifera,** *Arn. in Comp. Bot. Mag.* i. 322 (1835).
Thw. Enum. 66. C. P. 2427.
Fl. B. Ind. i. 454. Bot. Mag. t. 4623 (*I. cornigera*).

Annual, stem very stout, erect, 4–6 ft., scarcely branched, succulent, red ; l. large, 5–7 in., crowded near top of stem, oval or oval-ovate, much tapering at base, acute, finely

spinous-serrate, the lowest serratures filiform and glandular, nearly glabrous on both sides, slightly scabrous above, ciliate, thin, paler beneath, lat. veins numerous, parallel, conspicuous, petiole very long, the upper part winged, with a row of long, tentacular, marginal glands, red; fl. numerous, moderate-sized or rather large, on slender, glandular-hairy ped., in fascicles of 4–6 from the axils of lower and fallen l.; sep. minute, lip saccate, $\frac{3}{4}$ in. deep, densely hairy; spur very short, blunt, incurved; standard $\frac{1}{2}$ in., orbicular, hooded, with an erect, sharp beak on back, hairy, wings bifid, large, upper lobe short, rounded, lower lobe half-obovate, exserted from lip; capsule $\frac{3}{4}$ in., gibbous, pointed, glabrous; seeds flattened, pilose.

Montane zone, 3–6000 ft., extending also down to below 2000 ft.; rather rare. Hantane; Ramboda; Nuwara Eliya; Eratne, Kuruwita Korale. Fl. Feb., March, October; pet. pink and green, lip yellow, veined with red inside.

Endemic.

The stems, petioles, and midribs are a uniform purplish-red.

6. **I. macrophylla,** *Gardn. in Bot. Mag.* t. 4662 (1852).
Thw. Enum. 66. C. P. 1212.
Fl. B. Ind. i. 455. Bot. Mag. t. 4662.

Annual, stem very thick, 6–10 ft., scarcely branched, glabrous below, hairy above, succulent; l. very large, 5–12 in., crowded at upper part of stem, ovate, much tapering at base, acute, acuminate, spinous-serrate with the lower serratures filiform and glandular, glabrous or hairy above, hairy on the veins beneath, lat. veins numerous, parallel, very oblique, conspicuous, petiole very long, winged and gland-bearing in upper part; fl. rather small, very numerous, on slender, glabrous ped. much shorter than the petiole, in fascicles of 4–10; sep. minute, setaceous; lip compressed, shortly saccate, $\frac{1}{2}$ in. deep, sharply acuminate, glabrous or nearly so; spur very short, inflated and bilobed at end, incurved; standard $\frac{1}{2}$ in., oval, with an erect beak on the top; wings small, included in the lip, the upper lobe undeveloped, the lower oblong, obtuse; capsule turgid, beaked, glabrous; seeds much tubercled.

Montane zone, 4–7000 ft.; rather common. Fl. Jan., Sept.; dull orange-red.

Endemic.

The largest of our species, and handsome in foliage, but the flowers are inconspicuous. The stem, petioles, midribs, pedicels, and flowers are usually all coloured of a similar brick-red tint.

7. **I. repens,** *Moon Cat.* 18 (1824). **Gal-demata,** *S.* Wight, Ill. i. 160. Thw. Enum. 66. C. P. 2790.
Fl. B. Ind. i. 455. Wight, Ill. i. t. 61. Bot. Mag. t. 4404.

Perennial, with thick, prostrate, somewhat zigzag, angular, branched, glabrous stems rooting at the nodes ; l. small, $\frac{3}{4}$ in. long, on erect, glabrous petioles over 1 in., ovate-reniform, broader than long, truncate or subcordate at base but tapering into petiole, acute, sparingly spinous-crenate with the two lowest teeth filiform, slightly hairy above, paler, glabrous and shining beneath ; fl. rather large, $1\frac{1}{2}$ in. long, solitary, ped. $1\frac{1}{2}$–2 in., glabrous ; sep. $\frac{1}{6}$ in., lanceolate, acute, glabrous ; lip saccate, over $\frac{1}{2}$ in. deep, sharply pointed in front, gibbous at base, very hairy ; spur curved, inflated at end ; standard $\frac{1}{2}$ in., broader than long, keeled and hairy on the back ; wings deeply bilobed, the upper rounded, the lower obliquely truncate, with a raised ridge in the centre and an oblong process projecting from inner side ; capsule very hairy.

Moist country, up to 3000 ft. or more, on rocks ; rare. Four Korales (Moon) ; Sitawaka ; Ruanwelle ; Alagala ; Yatiantota ; Ambepusse ; Bambarabotuwa (Lewis). Fl. most of the year ; bright yellow, lip veined with crimson at the base within.

Endemic.

Very unlike the other species in habit and in its yellow flowers. It is much cultivated as an ornamental plant in pots and on rockwork, and looks more like a *Tropæolum* than a Balsam. The Sinhalese name alludes to a certain resemblance of the flowers to those of *Gmelina*.

The drawing in Wight, Ill. was made by Mrs. Walker.

8. **I. leptopoda,** *Arn. in Comp. Bot. Mag.* i. 321 (1835).
Hk. f. and Th. in Journ. Linn. Soc. iv. 132. *I. brevicornu*, Arn. and *I. gibbosa*, Arn. l. c. 321. Thw. Enum. 65. C. P. 140.
Fl. B. Ind. i. 455.

Annual, stems 1–3 ft., much branched, glabrous ; l. variable, $1\frac{1}{2}$–4 in., lanceolate or oval, acute at both ends, spinous-crenate, flaccid, glabrous, pale beneath, petiole $\frac{1}{2}$ in., slender ; fl. rather small, about $\frac{3}{4}$ in. diam., solitary or 2 together, on slender, glabrous ped. 1–$1\frac{1}{2}$ in. long ; sep. minute, lanceolate ; lip boat-shaped, beaked ; spur very slender, slightly curved, $\frac{1}{2}$ in. or shorter or quite absent ; standard $\frac{1}{3}$ in., broadly obcordate, keeled on back ; wings spreading, divergent, lobes rounded, truncate, eoual in length, the upper broader ; capsule smooth.

Upper montane zone ; very common. Fl. all the year ; pale pink.

Endemic.

A very variable plant. Arnott's species *I. brevicornu* and *I. gibbosa* cannot be maintained even as varieties, for flowers with long and short spurs and without spurs are all to be found on the same plant.

I. Leschenaultii, Wall. (Wight, Ic. t. 970 bis) may be the same as this; it is common in the Nilgiris. De Candolle, who first described it as *Balsamina Leschenaultii* (Prod. i. 686), says that Leschenault collected it in Ceylon,* but this is denied in Fl. B. Ind., where it is kept as a distinct species near *I. latifolia* (*cuspidata*).

9. **I. truncata,** *Thw. Enum.* 66 (1858).
C. P. 2426.
Fl. B. Ind. i. 455.

Annual, stem 1–2 ft., decumbent at the base and rooting at the nodes, hairy or glabrous; l. 1–3 in., oval, tapering to base, acute, spinous-crenate or nearly entire, glandular-hairy or glabrous, flaccid, pale beneath, petiole long, slender, winged in upper part; fl. small, ¾ in. diam., solitary (rarely 2), on slender, glabrous or hairy ped. ½–1 in. long; sep. minute; lip shallowly boat-shaped, hairy; spur very short, straight; standard ½ in., rotundate, cuspidate on back; wings ¾ in., approximate, lower lobe much the larger, ½-oval, upper lobe rounded, truncate; capsule pilose.

Montane zone from 4000–7000 ft.; rather common. Fl. all the year; pale pink or nearly white.
Endemic.
The very different wing-petals easily distinguish this from *I. leptopoda*.

10. **I. flaccida,** *Arn. in Comp. Bot. Mag.* i. 332 (1835). **Kudalu-mal,** *S.*
I. latifolia, Moon Cat. 18 (? L.). C. P. 2791.
Fl. B. Ind. i. 457. Bot. Mag. t. 5276 (good).

Annual, 1–2 ft., stems branched, swollen at nodes, rather zigzag, nearly glabrous, succulent; l. always alternate, 2½–4 in., oval or ovate, tapering into petiole, shortly acuminate, acute, glandular-serrate, glabrous above, paler beneath, with the lat. veins prominent and puberulous, thin, petiole ¾–1¼ in., flat on top; fl. rather large, 1–1½ in. diam., solitary, ped. 1½–2 in., smooth, erect; sep. minute, linear, acute; lip saccate, with an acute point, keeled; spur 1–1½ in., slender, curved; standard broadly obcordate, strongly keeled on back; wings very deeply lobed, lobes nearly equal, rounded, shallowly bifid; capsule 1 in., ovoid, pointed, gibbous; seeds globose, papillose.

Moist low country, extending upwards slightly into lower montane zone; very common. Fl. most of the year; bright mauve-pink, rarely white.
In Java; apparently also in Southern India, but I am not sure that the plant called *I. flaccida* there is the true plant.

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* Leschenault spent seven months in Ceylon in 1820–21, and visited the interior.

This may be really *I. latifolia* L.,* but that name has been so variously applied that it is better dropped (see under *I. cuspidata*), and one about which there is no question employed.

The most familiar of all our Balsams, being found everywhere in the low country in moist, shady places, but it is not a hill species. It is a very pretty plant, and there is a variety with the flowers pure white which has long been under cultivation in England under the name '*I. platypetala alba.*'

The Fl. B. Ind. erroneously quotes Bot. Mag. t. 5625 for this.

11. **I. Henslowiana,** *Arn. in Comp. Bot. Mag.* i. 322 (1835).
Thw. Enum. 65. C. P. 547, 49.
Fl. B. Ind. i. 458. Wight, Ic. t. 743 (*I. albida*).

Perennial (?), stem stout, semi-woody below, slightly branched, usually nodose with prominent leaf-scars, glabrous, white, young parts pilose; l. 3–4 in., lanceolate, crowded, tapering at both ends, acute, spinous-serrate with the lower serratures filiform-glandular, more or less hairy or nearly glabrous, petiole 1–2½ in., more or less hairy; fl. large, 1¾ in. or more diam., solitary, ped. 2 in., erect, hairy; sep. large, nearly ½ in., ovate, acuminate; lip about same length; spur long, 1½–2½ in., tapering, slightly curved, hairy; standard ¾ in., orbicular, broader than long, keeled on back; wings very large, lobes about equal, broad, rounded, flat; capsule 1–1¼ in., pilose.

Montane zone, 4000–6000 ft., in rocky places; rather common. Galagama; Ramboda; Wattakelle; Knuckles Mts. Fl. Sept., Oct.; white, more or less tinged with pink.

Also in Malabar.

12. **I. janthina,** *Thw. Enum.* 68 (1858).
C. P. 3003.
Fl. B. Ind. i. 461.

Annual, 6–9 in., stem short, about 3 in., simple, erect, very succulent, quite glabrous; l. few, 1–5, closely placed at top of stem, 2½–4 in., broadly oval, rounded at base, acuminate, acute, distantly spinous-serrate, thin, membranous, glabrous, petiole 1–2 in.; fl. ¾ in., ped. about as long, very slender, 2–8, arranged in umbels, which lengthen out into short racemes, peduncle erect, as long as or longer than l., bracts ovate, persistent; sep. cordate-ovate, lip saccate, spur tapering, curved nearly into a ring; standard rotundate, hooded, wings with the lobes nearly equal, the upper lobe acute, the lower rounded; capsule glabrous.

Moist low country; very rare. Hiniduma; Mapalagama; Lihinigala, in the Pasdun Korale. Fl. December, August; clear violet.

Endemic.

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* Koenig's specimen in Brit. Mus. is so named.

The violet-coloured flowers give this curious little plant a very different appearance to all the other species; the purple colouration extends to the pedicels and bracts.

13. **I. Hookeriana,** *Arn. in Comp. Bot. Mag.* i. 324 (1835).
I. biglandulosa. Moon Cat. 18. Thw. Enum. 66. C. P. 2425.
Fl. B. Ind. i. 463. Bot. Mag. t. 4704.

Perennial, stem 3–4 ft., semi-woody below, often nodose with prominent leaf-scars, glabrous; l. large, 5–7 in., crowded, spreading, oval, acute at base, slightly acuminate, acute, shallowly spinous-crenate, glabrous, petiole long, $1\frac{1}{2}$–3 in., with 2 conspicuous round glands at the summit; fl. very large, 1–2 in. diam., ped. $1\frac{1}{2}$–$2\frac{1}{2}$ in., 3 or 4 together at end of peduncle, which is shorter than l., bracts caducous; sep. small, $\frac{1}{4}$–$\frac{3}{8}$ in., narrowly lanceolate, lip funnel-shaped, gradually tapering into the much-curved spur 2–$2\frac{1}{4}$ in. long; standard wider than long, strongly keeled on back, emarginate, crisped on margin, cupped in centre; wings very large, lobes very unequal, upper obovate, shallowly 2-lobed, lower more deeply 2-lobed, all crisped on margin.

Montane zone, 3000–6000 ft.; common. Moon's locality is Uva. Fl. Oct.–March; white, stained and veined with vinous red.

Endemic (?).

It is questionable whether this should not be combined with *I. grandis*, Heyne, of the S. Indian mountains, in which case it would take that name. This is figured in Bedd. Ic. t. 153, who considers the Ceylon plant to be the same, but Hooker, in Fl. B. Ind., distinguishes them by apparently good characters. Arnott, l. c., also keeps them distinct, but considers a Ceylon specimen of Walker's to be probably *I. grandis.*

Perhaps the most beautiful of our Balsams, and certainly the one with largest flowers. Well known in cultivation at home; the amount of red in the flowers varies very much, it is sometimes altogether absent.

14. **I. subcordata,** *Arn. in Comp. Bot. Mag.* i. 323 (1835).
Thw. Enum. 67. C. P. 1230, 2789.
Fl. B. Ind. i. 461.

Annual, stem 1–$1\frac{1}{2}$ ft., branched at the base and often decumbent there and rooting, stout, succulent, glabrous; l. 2–$2\frac{1}{2}$ in., ovate, more or less cordate at base, acute, coarsely spinous-serrate or crenate, glabrous above, pale beneath with white, scurfy scales, petiole 1–2 in.; fl. rather small, $\frac{3}{4}$ in., on ped. about as long, 2 or 3 together at end of peduncles much shorter than l., bracts oblong, acute; sep. ovate, acute, conspicuous, lip small, boat-shaped, spur $\frac{1}{2}$ in., slender, curved; standard small, broadly oval, apiculate, wings large, the lobes very unequal, upper very small, rounded, lower large, oval, obtuse; capsule glabrous.

Montane zone, 4000–6000 ft.; rather rare. Ambagamuwa; Nuwara Eliya; Hewahette; Ramboda. Fl. October–Feb.; white, with the standard pink.
Endemic.

15. **I. leucantha,** *Thw. Enum.* 67 (1858).
C. P. 3548.
Fl. B. Ind. i. 464.

Annual, 4–10 in., stem erect, simple, succulent, glabrous; l. crowded at summit, 2–4 in., narrowly lanceolate, tapering into short petiole, acuminate, acute, distantly spinous-serrate with the lower teeth filiform glandular, glabrous or with a few scattered hairs, very thin; fl. about $\frac{3}{4}$ in., on slender, $\frac{1}{2}$ in. ped., few, in short, crowded racemes at end of straight peduncles rather shorter than l., bracts ovate, acute; sep. ovate, acute; lip small, boat-shaped, spur as long, conical, straight; standard short, rotundate, wings long, over $\frac{1}{2}$ in., approximate or over-lapping, lobes very unequal, upper small, lanceolate, lower 3-lobed, with the middle one the longest; capsule $\frac{1}{4}$ in., ovoid, pointed, glabrous; seeds finely muriculated.

Moist low country; very rare. Hiniduma; Kitulgala; Ambagamuwa. Fl. Sep., Nov.; white.
Endemic.

16. **I. linearis,** *Arn. in Comp. Bot. Mag.* i. 323 (1835).
Thw. Enum. 67. C. P. 372.
Fl. B. Ind. i. 464.

Perennial (?), stem stout, 9–12 in., prostrate at base then erect, succulent, glabrous, marked with prominent leaf-scars; l. 1–2$\frac{1}{2}$ in., numerous, rather crowded, sessile, linear- or lanceolate-oblong, tapering to base, acute, strongly and distantly spinose-serrate, glabrous, rather thick, paler beneath; fl. $\frac{1}{2}$–$\frac{3}{4}$ in., ped. long, slender, 6–10 crowded in a very short raceme, peduncle straight, exceeding the l., bracts ovate, apiculate; sep. oblong-ovate, apiculate; lip boat-shaped, rounded, acuminate; spur about as long as lip or shorter, slender, straight; standard short, wings long, approximate, upper lobe very small, oblong-oval, lower lobe large, half-oval, acute, slightly falcate.

Moist low country; very rare (?). Lower slopes of Adam's Peak; Veddagalle, Kukul Korale. Fl. March; rose-pink.
Endemlc.

17. **I. appendiculata,** *Arn. in Comp. Bot. Mag.* i. 323 (1835).
Thw. Enum. 67. C. P. 1207, 1208, 1209.
Fl. B. Ind. i. 464.

Annual, stem 6–12 in., stout, erect, sometimes branched below, glabrous; l. scattered on stem and also crowded at its

end, $1\frac{1}{2}$–$3\frac{1}{2}$ in., variable, ovate or oval or ovate-lanceolate, tapering or rounded at base, more or less acuminate, acute, spinous-serrate or -crenate or nearly entire, glabrous or pilose, petiole $\frac{3}{4}$–$1\frac{1}{2}$ in.; fl. about $\frac{3}{4}$ in., ped. long, slender, about 4–10, in very short umbellate racemes, peduncles straight, longer or shorter than l., bracts rather large, ovate, acuminate; sep. ovate, acute, lip boat-shaped, spur small, half length of lip, slender; standard small, hooded, wings large, approximated, upper lobe lanceolate, acuminate, lower much longer, half-cordate, acute.

Moist country, from about 1000–5000 ft., but chiefly in the lower montane zone; rather common. Fl. Oct.–Dec.; fl. white or pink, lip striped and dotted with brick-red.

Endemic.

The low country form (C. P. 1209) has larger and more pilose leaves.

18. **I. elongata,** *Arn. in Comp. Bot. Mag.* i. 324 (1835).
Thw. Enum. 67. C. P. 346.
Fl. B. Ind. i. 466.

Perennial, stem about 2 ft., woody below, unbranched, glabrous, nodose with prominent leaf-scars; l. mostly rather crowded near top of stem, 2–$3\frac{1}{2}$ in., oval, tapering at both ends, acute, spinous-serrate, glabrous, rather thick, lat. veins very oblique, prominent, pet. $\frac{3}{4}$–1 in.; fl. rather large, $1\frac{1}{4}$ in., in long-stalked (often apparently terminal) racemes, ped. 1 in., curved, thickened upwards, peduncles erect, much exceeding l.; sep. lanceolate, acute, lip small, boat-shaped, spur $1\frac{1}{4}$ in., slightly tapering, curved; standard very small, keeled on back, acute, wings large, over $\frac{1}{2}$ in., upper lobe small, lower one large, broad, half-rotundate, obtuse.

Lower montane zone; very rare. Only known from Adam's Peak, where first collected by Mrs. Walker. I found it half-way up on the Maskeliya side, at about 4500 ft., in abundance.

Fl. March; bright deep rose-pink.

Endemic.

A beautiful species; the whole plant is tinged with red.

19. **I. cornigera,** *Arn. in Comp. Bot. Mag.* i. 323 (1835) (non Hook.).
Thw. Enum. 67. C. P. 332.
Fl. B. Ind. i. 466.

Annual, stem erect, 1–3 ft., simple, glabrous below, glandular-hairy above, thick, succulent, swollen at the nodes; l. mostly crowded at upper part of stem, 2–4 in., lanceolate or linear-lanceolate, tapering at both ends, acute, spinous-crenate, thin, quite glabrous, red or purplish beneath, petiole very short; fl. rather small, on very slender, spreading ped. in erect, lax racemes, peduncle usually slightly exceeding the l.,

bracts oval, acute, persistent; sep. small, ovate, acute, lip funnel-shaped, tapering into spur, which is about ½ in., rather thick, slightly curved, narrowed into the suddenly curled-up end; standard small, rotundate, hooded, apiculate; wings ¾ in., upper lobe very small, ovate, lower much larger, long-stalked, exserted, oblique, cordate, attenuate, emarginate; fr. ⅓ in., tapering at both ends, beaked, glabrous; seeds few.

Moist low country; rather rare. Hiniduma Kande; Singhe Raja Forest; Ambagamuwa; Palabadulla, Kuruwita Korale, common. Fl. March; standard and spur pink, wings pinkish-white, with a dark yellow blotch.

Endemic.

The stems are of a dark blackish-purple colour. The leaves have frequently a band of silvery white down the centre, and the flowers have a singular resemblance to those of an orchid.

A form with wholly green flowers is figured among the drawings at Peradeniya.

20. **I. Arnottii,** *Thw. Enum.* 67 (1858).
Thw. Enum. 67. C. P. 725.
Fl. B. Ind. i. 466.

Annual (?), stem stout, tuberous at base, erect, 1–3 ft., simple, glabrous, swollen at the nodes; l. closely placed at top of stem, 2½–4 in., lanceolate, acute at base, somewhat attenuate, acute, spinous-crenate, glabrous or nearly so on both sides, purple beneath, petiole ½–1 in.; fl. rather small, on long, slender, spreading ped., arranged in a short raceme, peduncles erect, exceeding the l., bracts lanceolate, subacute; sep. very small, ovate, oblique, acute; lip saccate, passing gradually into the long spur, which is ¾ in. or more long, slender, tapering, curved at the end only; standard rotundate, hooded; wings ¾ in., upper lobe very small, lower very much larger, stalked, half-rotundate, with a tooth on inner edge.

Moist low country from 1000–3000 ft., and perhaps extending into montane zone; rare. Muruta (Gardner); Dolosbagie; Haputale. Fl. Jan.–April; pale violet-pink.

Endemic.

21. **I. Walkeri,** *Hook. Comp. Bot. Mag.* i. 324 (1835).
Thw. Enum. 66. C. P. 1211.
Fl. B. Ind. i. 468. Comp. Bot. Mag. i. t. 18 (drawn by Mrs. Walker), Bot. Mag. t. 5237.

Perennial, stem 2–3 ft., branched, glabrous, swollen at the nodes, usually purple; l. scattered, 2½–4 in., lanceolate, acute at base, somewhat attenuate, acute, spinous-serrate, sparsely hairy above, glabrous and purple beneath, petiole ¼–½ in.; fl. rather large, nodding, on slender ped. in lax racemes, peduncles scarcely exceeding l., bracts ovate, acuminate; sep.

oblong-ovate, acute; lip very large, saccate, nearly 1 in. deep, inflated; spur very short, narrow, blunt, strongly curved upward; standard $\frac{1}{2}$ in., broad, acute, hooded; wings small, $\frac{1}{2}$ in., upper lobe short, inconspicuous, lower lobe rotundate.

Montane zone, 4000–6000 ft.; rare. Between Ramboda and Nuwara Eliya; Maturata; Haputale; Uda Pusselawe; near Badulla.

Fl. Oct.–April; scarlet.

Endemic.

The Haputale specimens have yellow flowers.

5. **HYDROCERA,** *Bl.*

Annual; fl. in axillary clusters, irregular; sep. 5, the anterior one, lip (really posterior) shortly spurred; pet. 5, the posterior, standard (really anterior) large, the lateral ones distinct; stam. 5, fil. flat, anth. slightly coherent, opening at apex; ov. 5-celled, with 2 or 3 ovules in each cell, stigma sessile; fruit a drupe, stone bony, 5-celled; seeds one in each cell, without endosperm.—Monotypic.

H. angustifolia, *Bl. Bijd.* 241 (1825). **Diya-kudalu, Wal-kudalu,** *S.*

Herm. Par. Bat. 105. Herm. Mus. 35. Burm. Thes. 42. Fl. Zeyl. n. 315. *Impatiens triflora*, L. Sp. Pl. 938; Moon Cat. 18. *H. triflora*, W. and A., Thw. Enum. 68. C. P. 1210.

Fl. B. Ind. i. 483 (*H. triflora*). Burm. Thes. t. 16 f. 2 (bad). Herm. Par. Bat. t. 105.

Annual, stem long, erect, or floating and rooting at the nodes, with erect branches, thick, hollow, quadrangular, glabrous; l. very long, 5–8 in., alternate, sessile, linear, much attenuate at both ends, serrate, with 2 rounded glands at the base in the place of stip.; fl. rather large, about 1 in., on slender, glabrous ped. about $\frac{1}{2}$ in., usually 3 together at end of short, axillary peduncle, bracts oblong, obtuse, caducous; sep. oval-oblong, obtuse, unequal; lip concave, boat-shaped, acute, gibbous at base; spur short, blunt, curved, smooth at the end; standard broad, hooded, lower pet. long, clawed, included in lip, somewhat 3-lobed, with margin involute near the base, upper ones much smaller; drupe subglobose, under $\frac{1}{2}$ in., smooth, purplish-red, pulp scanty, green, stone sharply 5-angled, readily separating into its 5 constituent carp.

Low country in wet places, very common. Fl. all the year; white; the lip and lower pet. stained with yellow and pink.

Throughout India, Malay Peninsula, and in Java.

XXIX.—RUTACEÆ.

TREES or shrubs, sometimes scandent, often spinous; l. alternate, rarely opposite, pinnate or 3-foliolate, rarely 1-foliolate or simple, without stip., punctate with pellucid glands; fl. regular, bisexual, rarely unisexual or polygamous; sep. 4 or 5, usually more or less connate, imbricate; pet. 4 or 5, distinct, imbricate or valvate; stam. 4 or 5, 8 or 10, rarely 12, free, distinct or rarely monadelphous; disk large or small and annular; ov. often on a short gynophore, 2–7-, usually 4–5-, celled, with 2, or rarely 1, ovules in each cell (numerous in *Feronia*); styles free or connate; fruit usually an indehiscent, fleshy berry, rarely of distinct, dehiscent cocci; seeds with or without endosperm.

The genera are, as a rule, badly defined, especially in the *Aurantieæ*.

Fl. unisexual or polygamous; seeds with endosperm.
 Fr. of distinct dehiscent cocci (*Zanthoxyleæ*).
  L. opposite, 3-foliolate . . . . . 1. EUODIA.
  L. alternate, pinnate . . . . . . 2. ZANTHOXYLUM.
 Fr. syncarpous, indehiscent (*Toddalieæ*).
  L. tri-foliolate; stam. 5 . . . . . 3. TODDALIA.
  L. simple; stam. 8 . . . . . . 4. ACRONYCHIA.
Fl. bisexual (in *Feronia* polygamous); seeds without endosperm (*Aurantieæ*).
 Unarmed; l. pinnate.
  Ovule solitary in each ov.-cell . . . 5. GLYCOSMIS.
  Ovules 2 in each ov.-cell (1 in *Murraya Koenigii*).
   Pet. valvate; cotyledons crumpled . . 6. MICROMELUM.
   Pet. valvate or imbricate; cotyledons plane-convex; style long . . . . 7. MURRAYA.
   Pet. imbricate; style short . . . 8. CLAUSENA.
 Armed with axillary spines (occasionally suppressed).
  Ovules 1 or 2 in each ov.-cell.
   L. compound (3–7-foliolate).
    Cal. 4–5-lobed . . . . . . 9. LIMONIA.
    Cal. cupular not lobed . . . . 10. LUVUNGA.
   L. simple (1-foliolate).
    Climbing; disk (gynophore) conspicuous 11. PARAMIGNYA.
    Not climbing; disk small annular . 12. ATALANTIA.
  Ovules numerous in each ov.-cell . . . 13. FERONIA.

Chiefly plants of the low country, especially of the dry region, to which 6 of the 18 species of *Aurantieæ* are quite restricted. *Zanthoxylum* and *Luvunga* are found chiefly in the lower montane zone, and 5 other species ascend into it from the low country.

1. EUODIA, *Forst.*

Trees; l. opposite; fl. unisexual, in axillary panicles; sep. 4 (or 5), imbricate; pet. 4 (or 5), valvate; stam. 4 (or 5); disk large, 4-lobed; ov. deeply 4-lobed, 4-celled, with 2 ovules in each cell; fruit of 4 (or less by abortion) distinct, coriaceous cocci, splitting into 2 valves, with a separate horny endocarp; seed solitary in each coccus, embryo straight, in fleshy endosperm.—Sp. 22; 10 in *Fl. B. Ind.*

E. Roxburghiana, *Benth. Fl. Hongk.* 59 (1861). **Lunu-ankenda,** *S.*

Fagara Lunu-ankenda, Gaertn. Fruct. i. 334. *Zanthoxylum zeylanicum*, DC. Prod. i. 728. *Fagara triphylla*, Roxb., Moon Cat. 11. *Xanthoxylum triphyllum*, Juss., Thw. Enum. 69. *Euodia triphylla*, Thw. Enum. 409 (? DC.). C. P. 538.

Fl. B. Ind. i. 487. Wight, Ic. t. 204 (*X. triphyllum*).

A small tree with opp. branches, bark grey, smooth, young parts finely tomentose; l. opp., 3-foliolate, petiole as long as lflts, lflts. $2\frac{1}{2}$–4 in., nearly sessile, oval or obovate-oval, tapering at base, shortly acuminate, entire, emarginate, glabrous when mature, pale beneath, lat. veins prominent, nearly horizontal; fl. very small, on very short ped., densely crowded in small clusters at end of opp. branches of axillary, pubescent panicles much shorter than l.; sep. minute, rounded, pubescent; pet. ovate-oblong, acute; male fl.:—stam. rather exceeding pet., disk large, 4-lobed, pubescent; fem. fl.:—stam. shorter than pet., ovary pubescent, style much longer than pet.; ripe carp. 1–4, globular-ovoid, $\frac{1}{4}$ in., finely modulated, brown; seed hemispherical, smooth and shining, blue-black.

Moist country, 2000–6000 ft.; common, and at lower elevations, rarer. Fl. April-May; greenish-yellow.

Also in the mountains of India, the Malay Peninsula, Sumatra, and Java.

At the lower elevations the leaves are larger and less obovate; a variety with five leaflets occurred at Ratnapura, and is var. β. of Thw. Enum.

Wood soft and light.

2. ZANTHOXYLUM, *L.*

Trees or climbing shrubs; l. alternate; fl. unisexual, in axillary and terminal panicles; sep. 4; pet. 4, valvate; stam. 4; disk small; ov. divided into 4 almost separate carp., each with 2 ovules, style capitate; fruit of 4 (or less by abortion) coriaceous cocci dehiscent into 2 valves; seed

solitary in each coccus, embryo in fleshy endosperm.—Sp. 80; 11 in *Fl. B. Ind.*

Z. tetraspermum, *W. and A. Prod.* 148 (1834).
Thw. Enum. 69. C. P. 386.
Fl. B. Ind. i. 494.

A wide-climbing shrub, with long rope-like stems, set with large, woody, conical, spine-tipped prickles, $\frac{3}{4}$ in. high, smaller branches glabrous, with small, deflexed, hooked prickles; l. alternate, imparipinnate, 6–10 in., petiole and rachis cylindrical, armed beneath with numerous large, hooked prickles, lflts. in 3 or 4 pairs and a terminal one, sessile, $2\frac{1}{2}$–$3\frac{1}{2}$ in., oval or lanceolate, acute at base, suddenly attenuate, retuse, coarsely serrate, thick, smooth and glossy, lat. veins numerous; fl. small, on very short ped., arranged in pyramidal, finely tomentose, axillary and terminal panicles 2–4 in. long; sep. minute; pet. oblong, acute; ripe carp. 1–4, nearly globose, $\frac{1}{4}$ in., rugose; seed nearly globose, hanging out of the carp. when ripe, polished, black.

Montane zone, 3000–6000 ft.; rather common, much rarer at lower elevations. Fl. April, May; yellowish-pink.

Also in the Nilgiri Mts. and Kurg.

The young shoots are precisely like those of a wild rose.

A variety was collected near Eratne (below 1500 ft.) with smaller leaves, not shining, and very shallowly and coarsely crenate. It was not in fl., and the fruit had burst, but further examination may show it to be distinct.

Z. Rhetsa, DC., is occasionally cultivated. It is C. P. 3490, and is included in Thw. Enum. 69, where the native name 'Katu-kina' is given for it.

3. TODDALIA,* *Juss.*

Climbing, prickly shrub; l. alternate, 3-foliolate; fl. unisexual, in panicles; sep. 5, connate; pet. 5, valvate; stam. (usually) 5; ov. syncarpous, 2–7-celled, with 2 ovules in each cell, stigma capitate; fr. fleshy, indehiscent, 2–7- (usually 5-) celled, with a single seed in each cell; embryo curved, in fleshy endosperm.—Sp. 8; 2 in *Fl. B. Ind.*

T. aculeata, *Pers. Syn.* i. 249 (1805). **Kudu-miris,** *S.* **Kandai,** *T.*
Herm. Mus. 22, 36. Burm. Thes. 58. Fl. Zeyl. n. 143. *Paullinia asiatica*, L. Sp. Pl. 365. *Scopolia aculeata*, Sm., Moon Cat. 17. Thw. Enum. 69. C. P. 2413.
Fl. B. Ind. i. 497. Burm. Thes. t. 24. Wight, Ill. t. 66. Bentl. and Trim. Med. Pl. t. 49 (from a Ceylon specimen).

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* Kaka-toddali is given as the Malabar name of this by Rheede.

A small, erect or scrambling or climbing shrub, stems and branches more or less set with recurved, compressed, sharp prickles, cylindrical, glabrous or slightly tomentose; l. alternate, 3-foliolate, petiole divaricate, $\frac{1}{2}$–$\frac{3}{4}$ in., often with prickles beneath, lflts. sessile, articulated, $1\frac{1}{2}$–2 in., oval- or oblong-lanceolate, acute at base, obtuse or bluntly acuminate, very shallowly crenate-serrate, glabrous or with scattered stellate scales above, thick, gland-dotted, midrib often prickly beneath, lat. veins numerous; fl. small, $\frac{1}{6}$ in., on very short ped., in clusters at ends of branches of small axillary and terminal panicles shorter or longer than l.; cal.-lobes very small, triangular; pet. oblong, thickened at tip, longer in the fem. fl.; ov. raised on a short gynophore, oblong, glabrous, stigma sessile; fr. subglobose, apiculate, with 3–5 grooves, set with large sunk glands, orange-coloured; seeds sub-compressed, rounded on back, smooth.

Bushy places from sea-level up to 6000 ft.; very common. Fl. Jan.–April; cream-coloured.

Throughout India, and in Java, Sumatra, China, the Philippines, and Mauritius.

When growing as a shrub the prickles are smaller and less numerous.

The whole plant is bitter, and is employed as a tonic medicine; the seeds are hot and pungent.

4. ACRONYCHIA, *Forst.*

Tree; l. opposite or alternate, simple; fl. polygamous, in corymbose cymes; sep. 4, connate; pet. 4; stam. 8, anth. versatile; disk large, tumid; ov. sunk in top of disk, 4-celled, ovules 2 in each cell, stigma 4-lobed; fr. indehiscent, 4-celled, with a single seed in each cell; embryo straight, in copious endosperm.—Sp. 15; 2 in *Fl. B. Ind.*

A. laurifolia, *Bl. Bijd.* 245 (1825). **Ankenda,** *S.*

Herm. Mus. 23. Fl. Zeyl. n. 139. *Jambolifera pedunculata*, L. Sp. Pl. 349; Moon Cat. 31. *Cyminosma Ankenda*, Gaertn. Fruct. i. 280. *C. pedunculata*, DC., Thw. Enum. 69. *A. pedunculata*, Walp., Thw. Enum. 409. C. P. 1249.

Fl. B. Ind. i. 498. Vahl, Symb. t. 61 (*Jambolifera pedunculata*). Wight, Ill. t. 65 (*Cyminosma pedunculata*).

A small tree, with pale, smooth bark, young twigs glabrous; l. opposite or some alternate, 3–5 in., oval or oblong-oval, acute at base, usually shortly acuminate, obtuse, entire, glabrous and shining especially above, dark green, petioles about $\frac{1}{2}$ in.; fl. about $\frac{3}{4}$ in., on rather long ped., loosely arranged in pyramidal, divaricate, corymbose cymes on long,

straight, axillary peduncles; cal.-lobes short, broad; pet. $\frac{2}{8}$ in., strap-shaped, acute, inflexed at tip, hairy within at base, subpersistent; stam. shorter than pet., 4 inner rather shorter, fil. slightly dilated at base; disk tomentose; ov. tomentose, style very short; fr. nearly globular, $\frac{1}{2}$–$\frac{3}{4}$ in., glabrous, rough with immersed glands, harder in centre but with no distinct stone, 4-celled.

Moist region from sea-level up to 5000 ft.; common. Fl. Feb.–April; pale yellowish-green.

Also in E. Bengal, S.W. India, Malaya, and Cochin-China.

Confounded by Linnæus with *Eugenia Jambolana* (on which confusion see my note in Journ. Linn. Soc. xxiv. 140). Vahl's excellent figure was made from Ceylon specimens collected by Koenig, from whom are others in Brit. Mus.

The whole plant when bruised has a warm terebinthinate scent. The bark is used as an external application to sores and ulcers. Wood close-grained, rather heavy, yellowish-white.

5. GLYCOSMIS, *Correa.*

Shrubs or small trees without spines; l. imparipinnate; fl. in axillary panicles; sep. 5, distinct, imbricate; pet. 5, imbricate; stam. 10, distinct, alternate ones shorter; ov. on a broad, tumid gynophore, 2–5-celled, with 1 pendulous ovule in each cell, style very thick and short; fr. a 1–3-seeded berry. —Sp. 5; 4 in *Fl. B. Ind.*

Ov. 5-celled; infl. more or less stalked . . . 1. G. PENTAPHYLLA.
Ov. 2-celled; infl. nearly sessile . . . . 2. G. BILOCULARIS.

1. **G. pentaphylla,** *Corr. in Ann. Mus. Par.* vi. 384 (1804). **Dodan-pana,** *S.* **Kulapannai,** *T.*

Limonia pentaphylla, Retz. and *L. arborea*, Roxb., Moon Cat. 35. Thw. Enum. 45, 406 (incl. *G. arborea*, DC.). C. P. 180, 1192.

Fl. B. Ind. i. 599. Wight, Ic. t. 167 (*G. triphylla*).

A shrub or small tree without spines, bark thin, brown, young parts scurfy-pubescent; l. imparipinnate, rachis flattened with sharp edges, lflts. 3–5, often reduced to 1, rarely 7, nearly sessile, alternate or opposite, 2–5 in., oval, acute at base, shortly acuminate, obtuse, entire or faintly denticulate; fl. small, under $\frac{1}{2}$ in., nearly sessile, crowded in small clusters arranged in erect, rusty-pubescent, axillary panicles 1–4 in. long; sep. small, obtuse; pet. lanceolate, acute; fil. flattened; ov. on a short, thick gynophore, broader than long, studded with large glands, 5-celled, style as wide as ov., stigma capitate; berry globose, $\frac{2}{8}$ in., apiculate, smooth, pinkish-white or cream-coloured; seeds 1 or 2, testa membranous, cotyledons green.

Var. β. **longifolia,** *Oliv.* C. P. 3822.

L. unifoliolate, very large, 7–10 in., lanceolate-oblong.

Under the shade of trees, from sea-level throughout the low country up to 3000 ft.; especially abundant in the dry region, where it forms much of the undergrowth of the forest. Var. β. in the Singhe Raja Forest. Fl. Jan.–April; white, very sweet-scented.

Common throughout the Eastern Tropics.

G. pentaphylla is an inappropriate name, as the leaves are more frequently 3- or 1-foliolate and sometimes 7-foliolate. *G. arborea*, DC., cannot be separated as a species.

Specimens from Koenig are in Mus. Brit.

Wood close-grained, smooth, yellowish-white.

2. **G. bilocularis,** *Thw. Enum.* 45 (1858).
C. P. 3362.
Fl. B. Ind. i. 500.

Shrub; l. pinnate, lflts. 1½–2½ in., alternate, shortly stalked, narrowly lanceolate, acute at base, obtuse; fl. few together, sessile, in axillary, nearly sessile, clusters; pet. oblong; fil. much dilated throughout, concave; gynophore rather wider than ov.; ov. conical, truncate, 2-celled; fr. not seen.

Low country; very rare. Maturata District (Thwaites); near Mihintale, N.C. Prov. 1885. Fl. July, August; white.

Endemic.

The C. P. specimens of this are poor, but there is a good drawing The Mihintale plants perfectly agree with them. Perhaps only a variety of *G. pentaphylla*, but recognisable at once by its small narrow leaflets and the very small sessile inflorescence.

6. MICROMELUM, *Bl.*

Small trees, without spines; l. imparipinnate; fl. in corymbose cymes; cal. 5-lobed; pet. 5, valvate; stam. 10, distinct, alternate ones shorter; ov. on a short gynophore, 2–6-, usually 5-celled, with 2 superposed ovules in each cell, style as long as ov., deciduous; fr. a rather dry, 1-seeded berry; cotyledons leafy, crumpled.—Sp. about 4; 2 in *Fl. B. Ind.*

M. pubescens, *Bl. Bijd.* i. 137 (1825). **Wal-karapincha,** *S.* **Kakaipalai,** *T.*
Wight, Ill. i. 109. Thw. Enum. 46. C. P. 188.
Fl. B. Ind. i. 501. Bedd. Fl. Sylv. Anal. t. 7, f. 1 (fls. only).

A small tree, shoots very finely and densely pubescent; l. imparipinnate, 8–10 in., rachis pubescent, lflts. 9–15, alternate or sub-opposite, shortly stalked, 1½–3 in., very oblique at base, ovate-lanceolate, attenuate, obtuse, irregularly finely crenate and wavy, with very numerous, rather conspicuous glands, glabrous above, nearly so or slightly pubescent

beneath ; fl. $\frac{1}{4}$–$\frac{1}{2}$ in., very shortly stalked, arranged in terminal and axillary, spreading, pubescent, dichotomous, corymbose cymes, bracts small, opposite at the bifurcations ; cal.-lobes broad, triangular, pubescent ; pet. oblong-linear, spreading, pubescent ; ov. oblong, very hairy, style rather longer, very thick, stigma capitate ; berry $\frac{3}{8}$ in. long, oblong-ovoid, pointed, rough with glands, glabrous, yellow.

Low country, especially in the dry region ; rather common. Fl. Oct.–Feb.; white, strong-smelling.

Also in E. Bengal, Malay Peninsula and Islands, China, and Pacific Islands ; but not in S. India.

The scent of the leaves is faintly aromatic.

Apparently very variable in foliage and amount of pubescence, and easily confounded with *Murraya Koenigii* and *Clausena indica.* In its lobed calyx and long style our plant differs from the Malayan type of the species, and if considered a distinct species will take the name *M. zeylanicum*, as suggested by Wight (l. c.).

7. MURRAYA,* *L.*

Small trees or shrubs ; l. imparipinnate, inflor. cymose ; sep. 5, small, nearly distinct ; pet. 5, imbricate or valvate ; stam. 10, alternate ones usually shorter ; ov. with or without a short gynophore, 2- or 5-celled, with 2 or 1 ovules in each cell, style long, deciduous, stigma capitate ; fruit a 1–2- or 5-celled berry ; seeds 1–several, cotyledons plane-convex.—Sp. 5 ; 3 in *Fl. B. Ind.*

Fl. few ; pet. oval, imbricate ; ov. on a short gynophore.
  Rachis glabrous ; fruit 1-celled . . . . . 1. M. EXOTICA.
  Rachis pubescent ; fruit 5-celled . . . . . 2. M. GLENIEI.
Fl. numerous ; pet. linear, valvate ; no gynophore
  but a fleshy disk (*Bergera*) . . . . . . 3. M. KOENIGII.

1. **M. exotica,** *L. Mant.* ii. 563 (1771). **Ettériya,** *S.*
Moon Cat. 34. Thw. Enum. 45. C. P. 1199.
Fl. B. Ind. i. 502. Wight, Ic. t. 96.

A small, graceful tree, with smooth, yellowish-white, fibrous bark and slender, somewhat drooping branches ; l. imparipinnate, 4–7 in., rachis glabrous, lflts. 3–7, on short stalks, alternate or sub-opposite, oval or rhomboidal-oval, acute at base, obtuse, emarginate, glabrous and shining, the terminal one the largest ; fl. $\frac{1}{2}$–$\frac{3}{4}$ in. diam., campanulate, on short ped., 1–4 in short, cymose clusters from the axils of the upper leaves, drooping ; sep. very small, triangular, obtuse,

* Commemorates Johann Andreas Murray, Prof. Bot. at Gottingen, who died in 1791.

glabrous; pet. $\frac{3}{4}$ in. or more, oval-oblong, clawed, obtuse; ov. on a short annular disk or gynophore, 2-celled; berry $\frac{1}{2}$–$\frac{3}{4}$ in., ovoid, pointed, smooth, 1-celled, 1–2-seeded.

* Var. β. **buxifolia,** *Thw.* This is a more floriferous shrubby variety, much grown in gardens for its beauty and sweet scent. It is C. P. 1200. In Fl. B. Ind. i. 503 the name is misprinted '*brevifolia.*' It is wild in Northern India, but not in Ceylon.

Low country up to 3000 ft.; rather common. Fl. June, July; white, very sweet-scented.

Throughout India, and in China, Australia, and Pacific Islands.

The leaflets are sometimes reduced to one as in specimens from Trincomalie. Wood heavy, very hard, and close-grained, yellow; has been used as a substitute for boxwood for engraving.

2. **M. Gleniei,** *Thw. ex Oliv. in Journ. Linn. Soc.* v., *Suppl.* ii. 29 (1861). [PLATE XXII.]

Thw. Enum. 406. C. P. 3627.

Fl. B. Ind. i. 503 (*M. exotica*, L. var.).

A bush, much branched, bark very white, young twigs strongly pubescent; l. imparipinnate, $1\frac{1}{2}$–4 in., rachis strongly pubescent, lflts. 3–7, on short pubescent stalks, upper ones much the longest, rhomboid-lanceolate, obtuse, emarginate, lower ones rotundate, all slightly crenate, glabrous; fl. $\frac{1}{2}$–$\frac{3}{4}$ in. diam., about 3–7, in short, racemose, axillary and terminal cymes, ped. very pubescent; sep. very small, densely tomentose; pet. $\frac{1}{2}$ in.; ov. on a distinct gynophore, 5-lobed, 5-celled; berry large, 1 in., somewhat pyriform or urn-shaped, flat-topped, but mamillate in centre, 5-lobed or bluntly 5-angled, rough with large glands, shining, green, 5-celled, the large inflated cells each containing 1–3 globose green seeds.

Forests of the dry country; rather rare (?). Trincomalie (Glenie); about Anuradhapura, Mihintale, &c., abundant. Fl. Aug.; white.

Endemic.

This appears to be a very distinct species, and, apart from the remarkably different fruit, is readily known from *M. exotica*, under which it is placed in Fl. B. Ind., by the very pubescent, almost tomentose, inflorescence, calyx, rachis of leaves, and young parts generally, the smaller flowers and the different habit.

3. **M. Koenigii,** *Spreng. Syst. Veg.* ii. 315 (1825). **Karapincha,** *S.* **Karivempu,** *T.*

Bergera Koenigii, L., Moon Cat. 34. Thw. Enum. 406, 46. C. P. 2547.

Fl. B. Ind. i. 503. Wight, Ic. t. 13 (*Bergera Koenigii*).

A small tree, with dark grey bark, branchlets pubescent; l. imparipinnate, somewhat crowded, spreading, 6–10 in., rachis pubescent, lflts. 15–25, shortly stalked, 1–2 in., oval or oblong-lanceolate, very oblique at base, slightly caudate,

obtuse or emarginate, irregularly crenate, smooth above, pubescent beneath, the lower ones smaller and more rotundate; fl. about ½ in., on short ped. in much-branched, flat-topped, corymbose, terminal cymes, bracts minute; sep. triangular, subacute, pubescent; pet. linear, erect, glabrous, valvate, gland-dotted; stam. inserted on a fleshy disk, fil. narrowed at top; ov. glabrous, without a gynophore, 2-celled, with 1 (rarely 2) ovule in each cell, style long, stigma large; berry ¼–⅜ in., nearly globular, apiculate, rough with glands, black, 2-seeded.

Low country, especially in dry region; rather rare. Badulla; Maturata. Very much cultivated. Fl. Dec., August; white, scented.

Also in India.

This is the familiar 'curry-leaf,' a constant ingredient in curries and mulligatawny. Its scent is pungent and slightly aromatic. Wood hard, close-grained, smooth, pale brownish-yellow, durable.

Extremely like the small-leaved form of *Micromelum pubescens*, from which it may be distinguished by its more numerous more pubescent and smaller leaflets, and more compact corymbose terminal inflorescence.

This is the type of *Bergera*, Koen. It does not well agree with the other members of *Murraya*, and should perhaps be retained as a distinct genus.

8. **CLAUSENA,** *Burm.*

Small trees or shrubs; l. imparipinnate; fl. in racemes or panicles; sep. 4–5, small; pet. 4–5, imbricate; stam. 8–10; ov. on a short gynophore, 2–4-celled, with 2 ovules in each cell, style short, deciduous; fruit a 1–2-seeded berry, cotyledons plane-convex.—Sp. 14; 9 in *Fl. B. Ind.*

Fl. 5-merous, in terminal panicles . . . . 1. C. INDICA.
Fl. 4-merous, in axillary racemes . . . . 2. C. WILLDENOVII.

1. **C. indica,** *Oliv. in Journ. Linn. Soc.* v. *Supp.* ii. 36 (1861). **Migon-karapincha,** *S.*, **Paṇṇai, Puraṉkáinari,** *T.*

Thw. Enum. 406 and (*Bergera nitida*) 46. C. P. 2421, 1203.
Fl. B. Ind. i. 505. Kew Journ. Bot. iii. t. 2 (*Piptostylis indica*).

A small tree or shrub, young parts pubescent; l. imparipinnate, large, 6–12 in., rachis glabrous or puberulous, lflts. 7–13, distant, alternate, shortly stalked, 1½–3½ in., very unequal at base, ovate or lanceolate, obtusely acuminate, very faintly crenate, wavy, glabrous on both sides, shining; fl. small, ¼–⅓ in., shortly pedicellate, laxly arranged in a short, strictly terminal panicle; sep. ovate-triangular, ciliate; pet. oval-oblong; fil. slightly dilated in middle; ov. 2-celled, glabrous, glandular, on a short, broad gynophore, stigma capitate;

berry nearly globular, under $\frac{1}{2}$ in., smooth, gland-dotted, pale salmon- or cream-coloured, pulp abundant; seed solitary, green.

Low country, principally in the dry region; rather common; abundant at Anuradhapura. Fl. Jan.–March; greenish-white.

Also in Southern India.

Leaves faintly aromatic. Fruit edible. The larger shining leaflets and strictly terminal paniculate inflorescence with smaller flowers distinguish this from *Micromelum pubescens*, which it a good deal resembles.

2. **C. Willdenovii,** *W. and A. Prod.* 96 (1834). **Wéda-pana,** *S.*

Thw. Enum. 47. C. P. 1204.
Fl. B. Ind. i. 506. Wight, Ic. t. 14.

A small, slender tree or shrub, young parts puberulous; l. 6–12 in., imparipinnate, rachis puberulous, lflts. 7–15, distant, shortly stalked, very oblique at base, lanceolate or ovate-lanceolate, acuminate, finely crenate, very thin, conspicuously gland-dotted and finely reticulated, glabrous; fl. small, on rather long divaricate ped., arranged in slender, simple racemes from the axils of the young l. and shorter than them; sep. 4, broad-ovate, apiculate, glabrous; pet. 4, oval, concave, gland-dotted; stam. 8, fil. long, dilated at base; ov. on a short, narrow gynophore, cylindrical, 4-grooved, glandular, 4-celled, style stout; berry ovoid, smooth, greenish-white, 1–2-seeded.

Var. β. **pubescens,** *W. and A.* (sp.). C. P. 2546.

Lflts. larger, $2\frac{1}{2}$–3 in., with the rachis densely woolly-tomentose.

Dry country; rather rare. Jaffna (Gardner); Porativa Pattu, E. Prov. (Nevill); near Sigiri; var. β. in Maturata at about 3000 ft. Fl. June–Sept.; white.

The scent of the leaves is peculiar, like myrrh and aniseed combined.

Mr. Nevill says this is called by Sinhalese and Veddas in E. Prov. 'Etkara-bembiya.'

9. LIMONIA, *L.* (*Auct.*)

Small trees, usually with spines; l. compound, petiole winged; fl. in panicles or racemes; cal. 4–5-fid.; pet. 4–5, imbricate; stam. 8–10, fil. subulate; ov. 4–5-celled, without a gynophore, with 1 or 2 pendulous ovules in each cell; fruit a globose berry, 1–4-celled and seeded.—Sp. 4; all in *Fl. B. Ind.*

L. trifoliolate; fr. large, 1 in. . . . . . . 1. L. ALATA.
L. pinnate; fr. small, under $\frac{1}{2}$ in. . . . . . 2. L. CRENULATA.

1. **L. alata,** *W. and A. Prod.* 92 (1834). **Tumpat-kurundu,** *S.*
L. Cinnamomum, Moon Cat. 35. Thw. Enum. 45. C. P. 1191.
Fl. B. Ind. i. 508. Bedd. Fl. Sylv. Anal. t. 7, f. 4 (flowers). Wight, Ill. t. 41.

A small tree, with straight, sharp, axillary spines often in pairs, or spineless, bark thick, slightly rough, white; l. 3-foliolate, petiole narrowly winged, glabrous, lflts. sessile, oval or obovate, tapering to base, obtuse, often emarginate, almost entire, glabrous, shining, the terminal one largest; fl. about ½ in., on short ped., arranged in small, terminal and axillary panicles; cal.-segm. broadly ovate, obtuse, pubescent; pet. oblong, pubescent outside; ov. 5-celled, ovules 2 in each cell, style longer than ov., stigma capitate; berry globose, about 1 in., rough with glands, seeds several.

Dry country; common. Fl. May; white.
Also in Southern India.
The leaves are lemon-scented when bruised, the citrus-like fruit is very bitter. Wood very heavy and hard, close-grained, smooth, yellow.

2. **L. crenulata,** *Roxb. Cor. Pl.* i. 60 (1795).
L. acidissima, Auct. plur. (non L.), Moon Cat. 35. Trim. in Journ. Bot. xxvii. 162.
Fl. B. Ind. i. 507 (*L. acidissima*). Cor. Pl. i. t. 86.

A small, slender tree or large shrub, with rigid, flexuose branches and sharp, straight, woody spines over ½ in. long from axils of fallen l.; l. pinnate, 3–4 in., with 2 or 3 pair of opposite lflts. and a terminal one, petiole ¾ in., narrowly winged, rachis winged, broad, crenate, leaf-like between each pair, lflts. sessile, trapezoid-oval, obtuse, emarginate, crenate-serrate, dotted with pellucid glands; fl. not seen (4-merous, ov.-cells with 1 ovule); berry globular, under ½ in., smooth, 2–4-celled, 1–4-seeded.

Dry country; very rare. Observed, in fruit, in Jan., 1888, scattered over the country about Bibile and Ekiriyankumbura, Uva. Moon includes this name in his Cat., and gives Jaffna for locality.
Also in several parts of Peninsular India.
The small fruit is very acid and bitter.
I have shown in Journ. Linn. Soc. xxiv. 142, that Linnæus' *L. acidissima* was not this plant, but *Feronia elephantum* (which see). He no doubt afterwards confused the two plants (as is shown by his quotation of Hort. Malab. iv. t. 14, which represents the present species), but his name cannot be retained for either. As it is the species on which *Limonia*, L. was founded, that genus strictly falls to the ground, and, as the present plant forms the genus *Hesperethusa*, Roem., that name ought perhaps to be maintained in its stead.

10. **LUVUNGA,** *Hamilt.*

Climbing shrubs, with axillary spines; l. trifoliolate; fl. in axillary racemes; cal. cup-shaped, very obscurely 4–5-toothed; pet. 4–5, imbricate; stam. 8–10, fil. dilated, quite distinct, anth. oblong; ov. 3- (or 2-) celled, with 2 superposed ovules in each cell; fruit a large, 2–3-seeded berry.—Sp. 4; 2 in *Fl. B. Ind.*

L. eleutherandra, *Dalz. in Kew Journ. Bot.* ii. 258 (1850).
Thw. Enum. 48 and 406 and (*L. scandens*) 47. C. P. 1195.
Fl. B. Ind. i. 509.

A climbing shrub, with very long flexuose branches set with stout, sharp, woody, nearly straight, somewhat deflexed, axillary spines about 1 in. long, bark yellowish-white; l. large, 6–9 in., 3-foliolate, petioles divaricate, $1\frac{1}{2}$–$2\frac{1}{2}$ in., lflts. on short stalks, nearly equal, very variable, 3–8 in., oval or lanceolate or linear-lanceolate or oblong-linear, shortly acuminate, entire, glabrous, conspicuously gland-dotted; fl. $\frac{2}{3}$ in., pedicellate, in glabrous, axillary racemes or panicles shorter than the petiole; cal. glabrous; pet. thick, glandular; fil. quite distinct, dilated; disk or gynophore small, annular; ov. glabrous, style long, stout, stigma capitate; berry globular, $\frac{3}{4}$ in.

Lower montane zone; rather rare. Ambagamuwa; Hewahette; Ramboda. Fl. March, April; greenish-white.

Also in Southern India and Java.

The leaves are very variable; when the leaflets are oblong-linear, the plant looks very different from the type. Thwaites remarks that in some plants all the ovaries are entirely without ovules.

Scarcely distinct from *L. scandens*, Ham. of Assam and Burma, well figured in Bot. Mag. t. 4522.

11. **PARAMIGNYA,** *Wight.*

Climbing shrubs, with axillary spines; l. unifoliolate; fl. rather large, in axillary fascicles; cal. 4–5-toothed; pet. 4–5, imbricate; stam. 8–10, distinct, equal; fil. flat, anth. oblong; ov. on a conspicuous gynophore, 3–5-celled, with 1 or 2 ovules in each cell, style long, ultimately deciduous near the base; fruit a 1–5-seeded berry.—Sp. 6; all in *Fl. B. Ind.*

Very closely allied to *Luvunga.*

Cal. with 5 broad lobes, densely pubescent . . 1. P. MONOPHYLLA.
Cal. with 4 minute teeth, glabrous . . . . . 2. P. ARMATA.

1. **P. monophylla,** *Wight, Ill.* i. 109 (1840). **Wellangiriya,** *S.*
Thw. Enum. 47. C. P. 1201, 1202.
Fl. B. Ind. i. 510. Wight, Ill. t. 42.

A climbing shrub, shoots densely pubescent, the older branches with sharp, recurved, axillary spines ½ in. long; l. numerous, 2–4 in., oval or oblong-oval or lanceolate, rounded at base, obtuse or acute, entire or nearly so, glabrous except the pubescent midrib beneath, conspicuously gland-dotted, petiole ½ in., twisted; fl. ¾ in., on short pubescent ped., 1–3 together in the axils; cal. woolly-pubescent, lobes 5, shallow, rounded; pet. 5, oblong-linear, recurved; fil. hairy; ov. 5-celled, stigma large, capitate; berry globose-pyriform, over 1 in. long, smooth; seeds several, large, compressed.

Low country, principally in the dry region; rather common. Dolosbagie; Hanasgiriya; Kurunegala; Haragama; Pankulam, near Trincomalie; Mineri. Fl. March, August; white.

Also in India and Burma.

The dry country form has the leaves obtuse; in the moist region the leaves are acute, as in Wight's figure.

2. **P. armata,** *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 43 (1861).
Thw. Enum. 406. *Arthromischus armatus*, Thw. Enum. 47. C. P. 1197, 3115.
Fl. B. Ind. 511. Bedd. Ic. t. 275.

A climbing, much-branched shrub, branches long, slender, glabrous or puberulous, with numerous, long or short, straight or slightly curved, axillary spines; l. rather small, 1½–3 in., ovate-lanceolate or lanceolate or lanceolate-oblong, rounded at base, acuminate, acute or obtuse, entire, the margin often revolute, glabrous, petiole ¼ in., jointed in the middle; fl. nearly ¾ in., on rather long slender ped., 3–7 in the axils; cal. very small, 4-toothed; pet. 4, oblong; stam. 8, equal, fil. slightly dilated in middle; ov. 3–4-celled, with 1 ovule in each cell, gynophore narrow, stigma small, capitate; berry nearly globular or ovoid, ½–¾ in., yellow; seeds 1–4.

Ranges from the moist low country up to 6000 ft.; rare. Ratnapura; Karawita Kande; Ambagamuwa; Hangurankette; Ragalla, Uda Pussellawe; Elephant Plains. Fl. Nov., Dec.; greenish-white.

Also in Wynaad, &c., S. India (Beddome).

I collected another species of this (?) genus at Madola in Sabaragamuwa in Feb. 1882. It is an apparently spineless climber, with large clusters of flowers and large leaves, narrow linear petals about ½ in. long, and a very short and truncate calyx. My material is insufficient to describe it fully, but it is probably a new species.

12. ATALANTIA, *Correa.*

Small trees or shrubs, usually armed with straight, axillary spines; l. simple; inflor. axillary; cal. 4- (or 3- or 5-) lobed or irregularly split; pet. 4 (or 3 or 5), usually distinct, imbricate;

stam. 8 (or 10), distinct or united into a tube, equal or the alternate ones shorter, anth. various; disk small, annular; ov. without or with a very short gynophore, 2- or 4- or 5-celled, with 1 or 2 collateral ovules in each cell, style short or long, stigma capitate; fruit a berry with thick rind, 2–5-celled, 2–5-seeded.—Sp. 10; 6 in *Fl. B. Ind.*

Stam. combined into a tube.
  Fls. in umbels or corymbs . . . . . . 1. A. MONOPHYLLA.
  Fls. in racemes . . . . 2. A. RACEMOSA.
Stam. distinct.
  L. veiny; fil. flat . . . . 3. A. ZEYLANICA.
  L. veinless; fil. slender . . . . . . 4. A. MISSIONIS.

1. **A. monophylla,** *Correa, Ann. Mus. Par.* vi. 383 (1804). **Perunkuruntu,** *T.*
Thw. Enum. 44. C. P. 497.
Fl. B. Ind. i. 511. Wight, Ic. t. 1611 (*A. floribunda*).

A small tree or shrub, with numerous rigid branches, the older ones armed with short spines, young parts glabrous; l. 1½–3 in., rhomboid-lanceolate, acute at base, obtuse, deeply notched at apex, glabrous, thick, veiny, petiole short, slightly pubescent, with 1 or 2 linear or setaceous stipular scales at base; fl. ½ in., rather crowded in axillary umbels or corymbs, ped. ¼ in., glabrous, bracts small, ciliate; cal. glabrous, irregularly split to the base; pet. obovate-oblong, obtuse, recurved; stam. 8, fil. completely connate into a long tube and sometimes adnate to pet. at base, anth. broadly ovoid; ov. oblong, glabrous, 4-celled, style short, no gynophore; berry globular-ovoid, ¾ in., with a long apiculus, 4-celled, 4-seeded.

Dry region; common. Fl. July, August, December; white.
Also throughout Peninsular India.
Wight's figure shows a very large-flowered form. Wood very hard, heavy, close-grained, yellow.

2. **A. racemosa,** *W. and A. Prod.* 91 (1834).
Oliv. l. c. 24. Thw. Enum. 405. C. P. 3673.
Fl. B. Ind. i. 512. Wight, Ic. t. 71 (*Sclerostylis atalantioides*).

An (? always) unarmed bush; l. precisely as in *A. monophylla;* fl. also as in the last, but ped. shorter and arranged in short but distinct racemes; cal. glabrous, equally 4-fid, lobes acute; fil. united into a tube; berry as in the last.

Lower montane zone; apparently very rare. Galagama (Gardner); Nonpareil Valley, 1882 (? same locality). Fl. Feb.; white.
Also in S. India.
This is hardly separable from *A. monophylla* as a species.

3. **A. zeylanica,** *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 25 (1861). **Yakinaran,** *S.* **Péykuruntu,** *T.*

Burm. Thes. 143. Fl. Zeyl. n. 406 (*Phantis*). *Limonia monophylla*, L. Mant. 237; Moon Cat. 34. *Rissoa zeylanica*, Arn. Pug. 6. *Sclerostylis zeylanica*, Wight, Ill. 109. Thw. Enum. 46. *S. Arnottiana*, Wight, Ill. 109. Thw. Enum. 405. C. P. 1196.

Fl. B. Ind. i. 512. Burm. Thes. t. 65, f. 1 (poor).

A much-branched bush, usually armed with very sharp, stout spines ¼–1 in. long, bark smooth, brown, young parts glabrous; l. very variable, 1¼–3 in., lanceolate or oval-oblong or somewhat ovate, rounded at base, emarginate or 2-lobed at apex, entire, coriaceous, veiny, petiole short, thick, glabrous; fl. ½ in. or rather more, on somewhat slender, glabrous ped., usually crowded in short, very finely pubescent, corymbose or racemose cymes much shorter than the l., bracts minute; cal.-lobes broad, shallow, often obscure, finely ciliate; pet. 4 (rarely 3 or 5), oval, with a broad claw, obtuse, thick, slightly concave, glandular; stam. 8, alternate ones longer, quite distinct, fil. flat, rather wider than anth., anth. cordate-ovate, apiculate; ov. sessile, smooth, 2-celled, with 2 collateral ovules in each cell, style short, stout, stigma clavate; berry ½–¾ in., globular-ovoid, 2–4-seeded.

Var. β. **rotundifolia,** *Oliv.* *Sclerostylis rotundifolia*, Thw. Enum. 46. C. P. 3295.

Smaller, very much branched, unarmed; l. oval-rotundate, strongly emarginate or bilobed; fl. larger, more numerous, in longer-stalked racemes equalling or exceeding l.; cal. deeply and distinctly 4-lobed; ov. on a short gynophore.

Low country; rather common in both regions. Colombo; Kalutara; Puttalam; Ratmale, E. Prov.; Jaffna. Var. β. montane zone at about 4000 ft.; rare. Nillembe; Maturata. Fl. March–August; white, sweet-scented.

Also in S. India. Var. β. endemic.

Varies in size of fl. and length of ped. The figure of Burman (a very poor one) appears to represent this rather than *A. monophylla*, to which it is referred in Fl. B. Ind. and elsewhere; this is therefore *Limonia monophylla*, L. Hermann's specimen, however, is described by Linnæus (Fl. Zeyl. n. 406) under the name of *Phantis*, a name never afterwards referred to in his later works; it is certainly *A. zeylanica.*

4. **A. Missionis,** *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 25 (1861). **Pamburu,** *S.* **Kuruntu,** *T.*

Limonia citrifolia, Moon Cat. 34 (non Roxb.). *Limonia Missionis*, Wall., Thw. Enum. 45. Thw. Enum. 405. C. P. 1194.

Fl. B. Ind. i. 513. Hook. Bot. Misc. iii. t. supp. 33. Wight, Ic. t. 175.

A small tree, much branched, bark grey, rugged, branchlets very smooth, often sharply angled, armed with short, sharp

spines $\frac{1}{4}$–$\frac{1}{2}$ in. long; l. large, $2\frac{1}{2}$–4 in., broadly oblong- or obovate-oval, somewhat tapering at base, obtuse or rounded at apex, entire or shallowly crenate, undulate, glabrous, coriaceous, pellucid-punctate, veins very obscure; fl. numerous, $\frac{1}{2}$ in., in erect, glabrous panicles 1–$2\frac{1}{2}$ in. long; cal. small, 4–5-lobed, lobes acute; pet. 4 or 5, narrowly oval, spreading or recurved, soon falling; stam. 8 or 10, fil. slender, quite distinct, anth. narrowly oblong; ov. small, glabrous, on a short gynophore, 4–5-celled, with 2 ovules in each cell, style long, stout, thickened upwards; berry about 1 in., globular, with thick rind, 4- or 5-celled, each cell with 1 (or 2) globose seeds imbedded in glutinous mucilage.

Low country, chiefly in the dry region; rather common. Batticaloa; Jaffna; Panadure (Moon). Fl. April; white, fragrant.

Also in Southern India.

There are specimens from Van Royen in Mus. Brit., probably collected by Hermann.

The fruit is just like a small orange. Wood moderately heavy, rather hard, close-grained, smooth, pale yellow.

Citrus Hystrix, DC. Cat. Hort. Monsp. 97 (1813). To this apparently belongs the 'Kudalu-dehi' or 'Lima-dehi' of the Sinhalese, a tubercled Lime, commonly grown in native gardens and semi-wild (or possibly native) in the east of Ceylon. It is *C. Papeda*, Miq. (*Papeda Rumphii*, Hassk.), and is found in Burma and Khasia, and in Sumatra and other islands of the Malay Archipelago, whence it may have been introduced to Ceylon. It is well figured in Rumph. Herb. Amboin. ii. tt. 26, f. 1, and 27; and there is a coloured plate with the name *C. tuberoides* in Bennett's 'Rare Fruits of Ceylon.' Ceylon specimens from Koenig are in Brit. Mus. This is not improbably the original form of the now universally cultivated Lime, *C. Limonellus*, Hassk. (see also Bonavia in Journ. Linn. Soc. xxii. 213).

13. **FERONIA,*** *Correa.*

A small tree, with straight axillary spines; l. pinnate; fl. polygamous, in axillary panicles; cal. small, 5-toothed; pet. 5, imbricate; stam. 7–12, equal, distinct, fil. very short, anth. large, oblong; ov. on a short disk, 5-celled (spuriously 1-celled), with very numerous ovules on the dissepiments; fruit large, globose, indehiscent, 1-celled, with many seeds immersed in pulp.—Monotypic.

F. elephantum, *Correa in Trans. Linn. Soc.* v. 224 (1800). **Diwul,** *S.* **Vila, Vilátti, Mayladikkuruntu,** *T.*

Herm. Mus. 13, 17. Fl. Zeyl. n. 175. *Limonia acidissima*, L. (pro max. parte) non Auct. Moon Cat. 73. Thw. Enum. 48. C. P. 1205.

Fl. B. Ind. i. 516. Wight, Ic. t. 15. Bedd. Fl. Sylv. t. 121.

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* One of the deities to whom the ancients dedicated forests.

A small tree, branches numerous, with smooth, whitish bark and with sharp, straight, ascending spines $\frac{1}{2}$–$1\frac{1}{2}$ in. long; l. pinnate, 3–4 in., rachis and petiole flat, very narrowly winged, glabrous, lflts. opposite, in 2 or 3 pair and usually a terminal one, nearly sessile, 1–$1\frac{1}{2}$ in., oval or obovate, obtuse, entire, glabrous, basal ones the largest; fl. small, numerous, in small, paniculate, sessile cymes from the axils of fallen l., ped. slender, pubescent; cal. very small; pet. ovate, acute, spreading, smooth; stam. 7–12, fil. very short, anth. very large; disk finely woolly; ov. with numerous ovules in each cell, style very short, stigma fusiform; fruit large, 2–$2\frac{1}{2}$ in., globose, hard, pericarp woody, rough, whitish, 1-celled; seeds oblong, compressed.

Throughout the dry region; very common. Fl. Feb., March; pale green, stained with red-purple, anthers dark red.

Found through India, also in Java.

This is the 'Wood-apple' of the English, the hard fruit of which is sometimes mistaken for that of the Bael. The specific name refers to its common appellation in India, 'elephant-apple.'

Pulp of the fruit eatable. Wood hard, heavy, yellowish-white. Affords a good gum.

Ægle Marmelos, Corr., the Bael fruit, *Beli*, *S.*, *Vilvam*, T., is cultivated, though not very commonly. It is included in Linnæus' Flora Zeylanica, n. 212, and there is a drawing but no specimen in Hermann's Herbarium. It is C. P. 1206. Considered native in India.

XXX.—SIMARUBACEÆ.

TREES or shrubs; l. alternate, pinnate or simple, no stip.; fl. regular, bisexual or polygamous; sep. 4 or 5, more or less connate, imbricate or valvate; pet. 4 or 5, imbricate or valvate; stam. 5 (or 10) or 8, distinct; disk annular or inconspicuous; ov. 2–5-lobed or of distinct carp., with 1 or 2 ovules in each, styles distinct or connate; fruit of 1 to 5 distinct, indehiscent, 1-seeded carp.; seed with or without scanty endosperm.

Ovules solitary; styles connate.
  L. pinnate; fl. small . . . . 1. AILANTUS.
  L. simple; fl. large . . . . 2. SAMADERA.
Ovules 2 in each cell; styles distinct . . . . 3. SURIANA.

Low country plants; *Suriana* on the sea-shore.

1. AILANTUS,* *Desf.*

Large trees; l. pinnate; fl. polygamous, in large panicles; cal. 5-fid; pet. 5, valvate; stam. 10 (in bisexual fl. often fewer); disk 10-lobed; ov. 2–5-celled (usually 3-celled), with 1 ovule in each cell, styles combined; fruit of 1–5, distinct, flat, indehiscent, winged samaras; seed solitary in each samara, pendulous, with scanty endosperm.—Sp. 4; 2 in *Fl. B. Ind.*

A. malabarica, *DC. Prod.* ii. 89 (1825). **Kumbalu, Walbilin,** *S.*

Thw. Enum. 69. C. P. 3456.

Fl. B. Ind. i. 518. Wight, Ic. t. 1604. Bedd. Fl. Sylv. t. 122.

A lofty tree, with straight trunk and rough bark, branchlets with large, closely placed leaf-scars, young parts pubescent, with fine, simple or stellate hairs; l. very large, 1½–2 ft., crowded, spreading, pinnate, rachis cylindrical, with a raised line along upper side, very finely stellate-pubescent, much thickened at base, lflts. 16–20, distant, opposite or sub-opposite, shortly stalked, 3–5 in., ovate-oblong, tapering, acute, unequal at base with upper half larger and rounded and lower half acute, entire, margin slightly reflexed, glabrous, glaucous beneath, rather thick; fl. small, the bisexual rather larger than the male, numerous, shortly pedicellate, in long, loose, stalked, axillary panicles; cal. small, hairy, segm. acute; pet. oval-oblong, acute; stam. exceeding pet.; ov. ovoid, glabrous; samara 2½–3 in., flat, oblong, obtuse at both ends, papery, glabrous, with the seed about the middle; seed much compressed, circular.

Low country of the moist region; rather rare. Seven Korales; Colombo; Heneratgoda. Fl. Jan.; white.

Also in Southern India and Cochin China.

The bark is tonic and febrifuge. A brown, fragrant, resinous exudation is given by the inner bark, and is used in dysentery as well as material for incense. Wood very light, soft, and spongy.

Moon, Cat. 73, gives *Ailantus excelsa*, Roxb. for Jaffna. The present species was probably intended by him.

2. SAMADERA, *Gaertn.*

Small trees; l. simple; fl. large, bisexual, in stalked umbels; cal. 4- (or 5-) fid; pet. 4 (or 5), convolute-imbricate;

* From 'Ailanto,' said to be the native name of *A. glandulosa* in the Moluccas.

stam. 8 (or 10), fil. with a small scale at base; ov. on a gynophore, deeply 4-lobed, 4-celled, with 1 pendulous ovule in each cell, styles completely connate; fruit-carp. 1–4, distinct, indehiscent, flattened, hard, 1-seeded.—Sp. 3; 2 in *Fl. B. Ind.*

S. indica, *Gaertn. Fruct.* ii. 352 (1791). **Samadara,** *S.*
Herm. Mus. 5. Burm. Thes. 19, 25. Fl. Zeyl. n. 433 (*Samandura*). *Vitmannia elliptica*, Vahl, Symb. Bot. iii. 51; Moon Cat. 31. Thw. Enum. 70. C. P. 2766.
Fl. B. Ind. i. 519. Wight, Ill. t. 68. Vahl, Symb. Bot. iii. t. 60.

A small tree, bark transversely cracked, young parts glabrous; l. large, 7–10 in., oblong or oval-oblong, obtuse at base, usually shortly acuminate, entire, glabrous and shining on both sides, paler and veiny beneath, coriaceous, petiole $\frac{1}{2}$–$\frac{3}{4}$ in., very thick, usually curved; fl. 1$\frac{1}{2}$–2 in., in few- or many-fld. umbels, peduncle axillary, glabrous, short to very long, ped. $\frac{1}{2}$–$\frac{2}{3}$ in., glabrous, red; cal.-lobes broad, subacute, glabrous; pet. 1 in., linear-oblong, obtuse; stam. a little shorter than pet., basal scale hairy; ov. shortly stalked, glabrous, style filiform, a little longer than stam.; ripe carp. large, 2–2$\frac{1}{2}$ in., compressed, semicircular, with a straight inner edge, hard-leathery, smooth, reticulate, outer edge blunt, seed large.

Moist low country, in forests; rather common. Galle; Kalutara; Hewesse; Chilaw. Fl. March; pinkish-yellow.

Also on the Malabar coast of S. India.

The whole plant is very bitter, and the bark, root, and fruit are all used as febrifuge medicines. An infusion of the leaves is a good insecticide and destructive to white ants. Wood light, soft, pale yellow.

Hermann's specimens were not sufficient to enable Linnæus to define this plant, and he left it among his 'Dubiæ' in Fl. Zeyl. Specimens from Koenig are in Mus. Brit.

Brucea sumatrana, Roxb. is a common weed about Kandy and in some other parts, but is not native here, though it has a wide distribution throughout the Eastern Tropics. The whole plant is bitter, and the seeds (called 'Macassar Kernels') are much used in Java as a cure for dysentery.

3. **SURIANA,** *L.*

A small bush; l. simple; fl. bisexual, in short racemes; cal. 5-cleft nearly to the base, imbricate; pet. 5, imbricate; stam. 5 (or 10); ov. of 5 distinct carp., each with 2 erect, collateral ovules, styles distinct, basal, persistent; ripe carp. 2–5, small, 1-seeded; seed without endosperm.—Monotypic.

S. maritima, *L. Sp. Pl.* 284 (1753).
Trim. in Journ. Bot. 1889, 162.
Fl. B. Ind. i. 522. Lam. Ill. t. 389.

A low shrub, 2–4 ft. high, very much branched, soft with silky hair throughout, especially on the young shoots; l. numerous, sessile, densely crowded, erect, overlapping, small, about 1 in., spathulate-linear, acute, much tapering to base, entire, silky-pubescent, thick, readily disarticulating; fl. $\frac{3}{8}$ in., on slender ped., 3 or 4 together in short, axillary racemes slightly exceeding l., bracts linear, longer than ped.; sep. ovate, acuminate, pubescent, persistent; pet. rather shorter than sep., oval, rounded; stam. usually 5, short; ripe carp. surrounded by persistent sep., roundish, hairy.

Sea-shore; very rare. Foul Point, Trincomalie, first collected in 1885 by W. Ferguson; small island opposite Jaffna, 1890. Fl. Dec., Jan.; yellow.

Almost universally on the sea-shore throughout the Tropics.

It is remarkable that this common Tropical shore plant should never have been found on our coasts till so recently, especially as it is known to occur on those of the Andaman, Nicobar, and Laccadive Is., and perhaps also on the Maldives, and is readily carried by currents.

Resembles *Pemphis* in habit, but readily known by its conspicuous bright yellow fls.

XXXI.—OCHNACEÆ.

SMALL trees or shrubs; l. alternate, simple, with stip.; fl. regular, bisexual; sep. 5, distinct, imbricate, persistent; pet. 5, distinct, imbricate; stam. indef. or 10, distinct; ov. of 3–10 distinct carp. on a swollen gynophore, with a solitary ovule in each; styles basal, connate; ripe carp. 3–8, quite distinct, indehiscent, 1-seeded; seed with or without endosperm.

Anth. indef., opening longitudinally . . . . . . 1. OCHNA.
Anth. 10, opening by terminal pores . . . . . . 2. GOMPHIA.

All the four species are low-country plants.

1. **OCHNA,** *L.*

Small trees or shrubs; fl. in racemes or panicles from ends of short woody branches; sep. 5, imbricate, persistent; pet. 5, imbricate; stam. indef., anth. dehiscing longitudinally, deciduous; ov. of 3–10 distinct carp., on a swollen gynophore,

each 1-celled, with a solitary ovule; styles basal, connate; ripe carp. quite distinct on the enlarged gynophore, fleshy, 1-seeded; seed with endosperm.—Sp. 25; 5 in *Fl. B. Ind.*

Fl. large, 2 in. . . . . 1. O. SQUARROSA.
Fl. small, less than $\frac{3}{4}$ in.
Fl. few, or in umbellate panicles; ped. jointed $\frac{1}{4}$–$\frac{1}{3}$ from base . . . . 2. O. WIGHTIANA.
Fl. in corymbose racemes; ped. jointed near base 3. O. RUFESCENS.

1. **O. squarrosa,** *L. Sp. Pl. ed.* 2, 731 (in part) (1762). **Mal-kéra,** *S.* **Chilanti,** *T.*
Herm. Mus. 9. Fl. Zeyl. n. 209. *O. lucida*, Lam. Dict. iv. 510. Thw. Enum. 70. C. P. 1223.
Fl. B. Ind. i. 523. Wight, Ill. t. 69.

A small tree, young parts glabrous, buds closely covered with numerous acute leaf-scales; l. 2–5 in., oval or lanceolate, acute at both ends, finely crenate-serrate, the teeth minutely spinous, glabrous on both sides, veiny, petiole $\frac{1}{4}$ in., stip. lanceolate-subulate, deciduous; fl. large, 2–2$\frac{1}{2}$ in., in short umbellate panicles, ped. 1–1$\frac{1}{2}$ in., slender, glabrous, drooping, jointed near base; sep. $\frac{1}{2}$–$\frac{3}{4}$ in., broadly oval, obtuse, glabrous, many-veined; pet. a little longer than sep.; anth. long, linear, deciduous, fil. much shorter, persistent; styles completely combined, persistent, stigma lobed; ripe carp. 3–6, surrounded by the somewhat enlarged sep., ovoid, sessile, shining, black.

Var. β. **cordata,** *Thw. Enum.* 409. C. P. 1222.

L. smaller, 1–2 in., cordate at base, rounded at apex, more sharply serrate.

Dry country; rather rare. Jaffna; Trincomalie; Batticaloa; var. β. Matale East; Puttalam. Fl. June; yellow, fragrant.
Also in the Indian and Malayan Peninsulas.
Linnæus quotes for this Burman's t. 56, which is clearly *Gomphia angustifolia*, but all the specimens in Herb. Herm. seem *O. squarrosa.*
I have never seen more than 5 petals in Ceylon specimens.

2. **O Wightiana,** *Wall. Cat.* n. 2808 (1828). **Bo-kéra,** *S.* **Katkarai,** *T.*
O. Walkerii, Planch. in Hook. Lond. Journ. Bot. v. 653. Thw. Enum. 70. C. P. 1221.
Fl. B. Ind. i. 524. Wight, Ic. t. 223 (?).

A small tree or shrub, much branched, young parts glabrous; l. 1$\frac{1}{2}$–2 in., very shortly stalked, lanceolate or rhomboid-lanceolate, sub-obtuse at base, acute, finely serrate, paler beneath, veiny; fl. under $\frac{1}{2}$ in., solitary or 2 or 3 together, ped. jointed $\frac{1}{4}$–$\frac{1}{3}$ from base; sep. oblong-oval, much enlarged

in fruit; pet. about equalling sep.; anth. about as long as fil.; ripe carp. 5–7, $\frac{1}{2}$ in., smooth, purplish-black.

Var. β. **Moonii,** *Trim.* *O. squarrosa*, Moon Cat. 41 (non L.). *O. Moonii*, Thw. Enum. 70. C. P. 1224, 2554.

L. much larger, 3–6 in.; fl. larger, $\frac{3}{4}$ in., 6–12, in umbellate panicles.

Low country; the type rather common in the dry region. Jaffna; Mannar; Trincomalie; Puttalam; Haragama. Var. β. in the moist region up to 2000 ft.; common. Fl. Nov.–Feb.; bright yellow, sep. crimson in fruit.

Also in Travancore.

Wood light, soft, pale yellow.

C. P. 2554 connects var. β. with the type, otherwise *O. Moonii* seems worthy of specific rank, and is our commonest *Ochna*.

3. **O. rufescens,** *Thw. Enum.* 70 (1858).
C. P. 3455.
Fl. B. Ind. i. 523 (under *O. squarrosa*).

A small tree or shrub, young parts glabrous; l. 4–6 in., very shortly stalked, tapering to base, acuminate, very acute, oblong-lanceolate, finely but sharply spinous-serrate, glabrous, veiny, stip. subulate, longer than petiole; fl. small, $\frac{1}{3}$ in., 6–12 together in short corymbose racemes, ped. $\frac{3}{4}$–1 in., slender, jointed near the base; sep. $\frac{3}{8}$ in., oblong, obtuse; pet. oblong, nearly equalling sep.; ripe carp. 7–8.

Moist low country; very rare. I have only seen the C. P. specimens which were collected on Nillowe Kande, Hiniduma Pattu, in 1855, by Thwaites. Fl. May; yellow.

Endemic.

This is placed as a synonym under *O. squarrosa* in Fl. Brit. Ind., but it is much nearer to *O. Moonii*, from which it differs in its much smaller flowers, more distinctly racemose.

O. nitida, Thunb., collected by Thunberg in Ceylon (*Florula*), may possibly be this species (see Planch. in Hook. Lond. Journ. Bot. v. 650). It is described and figured from the specimen in Herb. Delessert by De Candolle in Ann. Mus. xvii. 412, t. 12.

2. **GOMPHIA,** *Schreb.*

Small trees; fl. in large terminal panicles; sep. 5, imbricate, persistent; pet. 5, imbricate; stam. 10, anth. dehiscent by terminal pores; ov. of 5 distinct carp., each 1-celled; styles basal, connate; ripe carp. quite distinct, on greatly enlarged gynophore, 1-seeded; seed without endosperm.—Sp. 80; 3 in *Fl. B. Ind.*

G. angustifolia, *Vahl, Symb.* ii. 49 (1791). **Bo-kéra,** *S.*
Burm. Thes. 123. *Meesia serrata*, Gaertn. Fruct. i. 344. *Ochna zeylanica*, Lam. Dict. iv. 512. *Walkeria* serrata*, Willd., Moon Cat. 17. *Gomphia zeylanica*, DC. Prod. i. 736. Thw. Enum. 71. C. P. 2412.
Fl. B. Ind. i. 525. Burm. Thes. t. 56 (good).

A small, much-branched tree, young parts glabrous; l. 2½–5 in., distichous, nearly sessile, lanceolate, acute at both ends, finely serrate, glabrous, shining, veins very close and numerous, pellucid, with 2 marginal ones near the edge, stip. deciduous; fl. numerous, about ½ in., on slender ped., in large pyramidal, terminal and axillary panicles; sep. oval, acute, glabrous; pet. twice as long as sep., clawed, obtuse; stam. 10, fil. very short, anth. large, oblong; ov.-carp. ovoid, smooth, style stout, much exceeding stam.; ripe carp. 5 (or fewer), attached near their base to sides of the very large gynophore, surrounded by the persistent sep., $\frac{1}{4}$–$\frac{3}{8}$ in., ovoid-reniform, purple-black, shining; seed erect, embryo green.

Low country, especially in the upper zone; common; rarer in the dry region, as Pattipal Ar, Uva and Ritigala, N.C. Prov. Fl. Jan.–April; yellow, sep. red.

Also on the Malabar Coast, Singapore, and the Philippines.

Wood moderately hard, close-grained, pale brownish.

A form with smaller coriaceous leaves and abreviated inflor. was collected on Nillowe Kande, S. Prov.

XXXII.—BURSERACEÆ.

TREES; l. alternate, compound, without or rarely with stip.; fl. small, regular, unisexual or polygamous; cal. 3–5-fid, valvate or imbricate; pet. 3–5, valvate or imbricate, distinct; stam. 4, 5, 6, 8 or 10, inserted outside or on (rarely within) the disk; disk annular or lining cal.-tube, fleshy, conspicuous or inconspicuous; ov. 2–3-celled, with 2, or rarely 1, ovules in each cell; fruit a drupe, the epicarp sometimes 2-valved, endocarp hard or membranaceous, often surrounded by a fleshy or pulpy mesocarp, 1–3-celled, with a solitary seed; cotyledons crumpled or folded, no endosperm.

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* This is an error for *Walkera*, Willdenow's name for the genus. It is not commemorative of any one, but taken from the native name, which is given by Gaertner as 'Wal-kera,' doubtless a misprint for 'Mal-kéra,' the name of *Ochna squarrosa* (*q. v.*).

Stam. 8 (or 10); fl. in dichotomous cymes. .	1. BALSAMODENDRUM.
Stam. 6 or 10; fl. in panicles	2. CANARIUM.
Stam. 5	3. FILICIUM.

All 5 species are confined to the low country; *Balsamodendrum* to the dry region, *Canarium brunneum* to the moist.

1. **BALSAMODENDRUM,** *Kunth.* (Includes *Protium*, W. & A., non Burm.)

Small trees; l. compound; fl. small, polygamous (male and bisexual), in dichotomous cymes; cal. 4- (or 5-) toothed; pet. 4 (or 5), valvate or slightly imbricate; stam. 8 (or 10), alternate ones shorter or suppressed; disk fleshy, annular, lobed; ov. 2-celled, with 2 suspended ovules in each cell, style 0, stigma 4-lobed; fruit a drupe, epicarp 2-valved, stone surrounded by a 4-lobed fleshy mesocarp, 1-seeded; seed with cotyledons much folded and crumpled, no endosperm.—Sp. about 12; 6 in *Fl. B. Ind.*

Lflts. entire, attenuate-caudate	1. B. CAUDATUM.
Lflts. crenate-serrate, obtuse	2. B. BERRYI.

Attention is called to the lobed arillus-like mesocarp in this genus, which seems to have been overlooked by monographers.

Protium cannot be maintained as a genus distinct from *Balsamodendrum;* both are sunk in *Commiphora* by Engler.

1. **B. caudatum,** *March. in Adansonia,* vii. 266 (1867). **Kilivai,** *T.*

Protium caudatum, W. and A., Thw. Enum. 78. *Commiphora caudata,* Engl. in Mon. Phan. iv. 28. C. P. 1261.

Fl. B. Ind. i. 530 (*Protium*). Bedd. Fl. Sylv. t. 125.

A small deciduous tree, with a thick trunk and smooth, pinkish bark which flakes off in large pieces, much branched, young parts quite glabrous; l. imparipinnate, articulated, deciduous, rachis 3–7 in., glabrous, lflts. in 2 or 3 (rarely 4) pair and an odd one, $1\frac{1}{2}$–3 in., shortly stalked, oval or ovate, unequal at base, attenuate-caudate, with very long, slender tail, entire, glabrous; fl. numerous, small, in numerous, long-stalked, crowded, dichotomous cymes 3–8 in. long, from the ends of branches below the new leaves and appearing before them, ped. slender, divaricate, bracts minute; cal. campanulate, glabrous, lobes shallow, acute; pet. erect, oblong or linear, with a recurved point; stam. 8, alternate ones shorter, longer in male than in bisexual fl.; ov. conical, longer than stam.; fruit appearing with the young l., pendulous, broadly

ovoid, blunt, slightly compressed, $\frac{5}{8}$ in., supported on small persistent cal., epicarp fleshy, valves wholly deciduous, each readily again splitting down centre, stone lenticular, flatter and thicker on one side, hard, thin, 1-celled (by abortion of the other), surrounded by aril-like, pulpy, 4-lobed, scarlet mesocarp; seed suspended, testa membranous.

Rocky hills in the dry region ; rather rare. Kalpitiya ; Trincomalie ; Bintenne ; foot of Ritigala ; Kekirawa and other places in N.C. Prov.; Dambulla ; Nilgala, Uva. A bush which is apparently this species (but which has the l. often slightly serrate) is used everywhere as a live fence throughout the Jaffna Peninsula. It attains a considerable size, but is always, I think, planted, and fruits freely. Fl. July; pinkish or red.

Also in Southern India.

The whole plant is strongly resinous and has an agreeable scent.

I have not been able to get a Sinhalese name for this with certainty, but I have heard it called 'Siviya' and 'Ensalu,' and a specimen of wood labelled 'Masbedde' (from N.C. Prov.) seems to be the same.

2. **B. Berryi,*** *Arn. in Ann. Nat. Hist.* iii. 86 (1839). **Mulkilivai,** *T.*

Trim. in Journ. Bot. xxiii. 143.

Fl. B. Ind. i. 529. Bedd. Fl. Sylv. t. 126.

A small, much-branched tree or bush, bark smooth, silvery-purplish, lateral branchlets divaricate, often spinous ; l. compound, often crowded, rachis glabrous, lflts. in 1 or 2 pair and an odd one, sessile, obovate-oval, tapering to base, obtuse, usually crenulate-serrate, glabrous ; fl. small, shortly stalked, in small pedunculate, dichotomous cymes, $\frac{1}{2}$–$1\frac{1}{2}$ in. long, several together from end of short lateral branchlets ; cal. glabrous or pubescent, teeth triangular, acute; pet. erect, long-clawed, twice as long as cal., linear-spathulate, concave, strongly recurved at end; stam. (in male fl.) 8 or 4, about equalling pet.; fruit not seen.

Dry and desert region ; rare. Said to be wild in the islands in the Gulf of Mannar, especially on Delft I. (Neduntivu), whence it is brought to the mainland. Much used as a hedge-plant, but not wild, in the Jaffna Peninsula and down the west coast to Negombo; also at Vavuniya, N. Prov.; often mixed with *B. caudatum.* Fl. March ; pale pinkish-yellow.

Also in dry parts of S. India.

I have not met with the fruit ; the fl. are very liable to attacks of insects resulting in malformation and hypertrophy.

At Colombo, where this is sometimes grown for a fence, the spines almost disappear, the leaflets become much larger, and the inflorescence more developed, the whole plant thus putting on a very different look.

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* Commemorates Dr. Berry of Madras, who first sent it to the Calcutta Botanic Garden.

In Indian specimens (from Coimbatore) the fls. are quite sessile in little clusters of 2–5, and the lflts. (always 3) thick and rigid, the terminal one much the largest.

Closely allied to the plants affording Myrrh (*B. Myrrha*, Nees), and Balm of Gilead, (*B. Opobalsamum*, Kunth); both fully described and figured in 'Medicinal Plants,' tt. 59, 60.

Boswellia glabra, Roxb. There are leafless flowering twigs of this under C. P. 3878 collected by Glenie 'between Nalande and Dambulla, March, 1865.' This should be looked for, but is scarcely likely to be indigenous to Ceylon.

2. **CANARIUM,** *L.*

Large trees; l. imparipinnate, with or without stip; fl. unisexual, in panicles; cal. 3- or 5-lobed, valvate; disk lining cal.-tube; pet. 3 or 5, valvate or imbricate; stam. 6 or 10; ov. 2- or 3-celled, with 2 ovules in each cell; fruit a drupe, epicarp fleshy or leathery, stone hard, 1–3-celled, surrounded or not by watery pulp; seed solitary or 2, with large, much-folded and often crumpled cotyledons.—Sp. 30; 18 in *Fl. B. Ind.*

Fl. 5-merous, ov. 2-celled (*Scutinanthe*) . . . . 1. C. BRUNNEUM.
Fl. 3-merous, ov. 3-celled . . . . 2. C. ZEYLANICUM.

1. **C. brunneum,** *Bedd. Fl. Sylv.* t. 127 (1868?). **Mahabulumora,** *S.* [PLATE XXIII.]

Scutinanthe brunnea, Thw. in Kew Journ. Bot. viii. 266; Enum. 79. *Garuga brunnea*, March. Rech. Burser. 18. Engl. in Mon. Phan. iv. 105. C. P. 1149.

Fl. B. Ind. i. 531. Kew Journ. Bot. viii. t. 8, f. B. Bedd. Fl. Sylv. t. 127.

A large tree, 50–60 ft., with a straight, erect, buttressed trunk, bark rough, not furrowed, blackish, young shoots densely pubescent; l. imparipinnate, rachis 8–12 in., cylindrical, pubescent, lflts. 3–5 pair and a terminal one, on pubescent, ½ in., stalks, 4–6 in., oval or oblong-oval, acute or obtuse and often unequal at base, acuminate, acute, entire, glabrous, veins prominent beneath, no stip.; fl. on very short ped., in fulvous-tomentose, axillary panicles 4–6 in. long, bracts small, densely tomentose; cal. cup-shaped, very thick and fleshy, 5-cleft; pet. 5, scarcely longer than cal. and inserted on its tube, very thick; stam. 10, inserted on cal.-tube, fil. very short, connate below, rudimentary in fem. fl.; ov. conical-ovoid, hairy, 2-celled, style very short, stigma capitate (ov. glabrous with longer style in male fl.); fr. 1½–1¾ in., ovoid, supported on the somewhat enlarged cal., narrowed at base, pointed, finely tomentose, brownish-orange, epicarp

readily separable, leathery, thin, stone very thin, hard, brittle, somewhat compressed, pointed at both ends, greyish-white, 1-celled, covered externally by a thick layer of watery, pulpy tissue (forming the bulk of the fruit) through which radiate from the stone numerous very fine long hairs; seed solitary, cotyledons very large, cordate-ovate, acute, entire, very much folded and crumpled.

Upper zone of the moist low country; rare. Allagala; Kadugannawa; Morankanda, W. Matale; Kuruwita Korale. Fl. March-May; brownish-white.

Endemic.

Scutinanthe seems to be a good genus, abundantly distinct from *Canarium*, with which, however, it is combined by nearly all recent authorities. Marchand, however, places it under *Garuga*, which, if it is to be reduced, would seem a better position for it. The fruit is very incorrectly figured both by Beddome and by Engler (Mon. Phan. iv. t. iii. f. 9–14). The structure of the flowers is perigynous.

The pulp of the fruit, which is very watery and a development of the fine long hairs which cover the surface of the pyrene, is pleasant but slightly bitter to the taste and devoid of any resinous flavour, as indeed is the whole plant.* The seed is very bitter.

2. **C. zeylanicum,** *Bl. Mus. Bot.* i. 218 (1849). **Kékuna,** *S.* **Pakkilipal,** *T.*

Herm. Mus. 52. Burm. Thes. 28. *Amyris zeylanica*, Retz. Obs. iv. 25. *C. balsamiferum*, Moon Cat. 68. Engler in Mon. Phan. iv. 113. Thw. Enum. 79. C. P. 2649.

Fl. B. Ind. i. 532.

A very large much-branched tree, with smooth, pale, thin bark, young shoots covered with dense fulvous pubescence; l. imparipinnate, rachis 6–8 in., cylindrical, thick, almost woody, pilose, lenticellate, brown, lflts. 3 pair and a terminal one, on short, stout, pilose, brown stalks, 2–3 in., broadly oblong-oval, subcordate at base, very shortly acuminate, entire, margin somewhat reflexed, glabrous, not shining, subcoriaceous, rigid, deep apple-green, veins yellow, very broad, very conspicuous above, lateral ones prominent beneath, stip. on the petiole and looking like a lower pair of small lflts., rotundate-sagittate, shortly stalked, quickly falling and leaving prominent raised scars; fl. on short, stout ped., arranged in narrow, rufous-tomentose, pedunculate, terminal panicles, the male numerous, $\frac{1}{4}$–$\frac{3}{8}$ in., crowded, the female few, $\frac{1}{2}$–$\frac{3}{4}$ in., bracts rotundate, tomentose, soon falling; male fl.:—cal. cup-shaped, 3-lobed, pilose; pet. 3, twice as long as cal., acute, erect, very thick, pilose outside; stam. 6, erect, shorter than pet., ov. a mere rudiment; female fl.:—cal. and

* There is a slight resinous odour in the bark when fresh.

pet. as in male; stam. 6, rudimentary; ov. 3-celled, glabrous, style short, stigma capitate, large, 3-lobed; drupe supported on the enlarged and hardened persistent cal., $1\frac{1}{2}$ in., oblong-ovoid, faintly trigonous, blunt, plum-coloured with a blueish-grey 'bloom,' pulp scanty, stone very thick and bony, usually 3-celled (one or two generally small and empty), seed large, oblong, testa thin, brown, cotyledons longitudinally plicate, lobed, not crumpled.

Low country in the moist region; common. Also at Batticaloa. Fl. May–Sept.; pale greenish-yellow.

Endemic.

Whole tree fragrant when bruised. Abundance of a beautifully clear fragrant balsamic gum-resin, like the Elemi of commerce, flows from the bark; it is much used for fumigation, and also burnt for light in houses, mixed with sand. Hermann, who spells the name 'Kækuriaghaha,' notices the flow of gum Elemi. The oily seeds are eaten. Wood rather light and soft, even-grained, white.

C. commune, L., the Java Almond, *Rata-kékuna*, S., is not unfrequently found as an introduced tree; it is a native of Malaya generally. The fruit is considerably larger than in *C. zeylanicum*, and the seeds form a good substitute for almonds.

3. FILICIUM,* *Thw.*

Tree; l. pinnate, without stip.; fl. unisexual, in panicles; cal. 5-cleft; pet. 5, imbricate; disk large, hairy; stam. 5, inserted within the disk; ov. 2-celled, with 1 suspended ovule in each cell; fruit a drupe, epicarp fleshy, endocarp membranaceous, 1-celled; seed solitary, cotyledons much crumpled, no endosperm.—Monotypic.

The genus is considered to belong to *Sapindaceæ* by Thwaites, Radlkofer, and Engler.

F. decipiens, *Thw. Enum.* 408 (1864). **Pehimbiya,** *S.*

Herm. Mus. 5, 35. Fl. Zeyl. n. 443. *Rhus decipiens*, Wight, Ill. i. 184. *Pteridophyllum decipiens*, Thw. in Kew Journ. Bot. vi. 66; Enum. 59. C. P. 536.

Fl. B. Ind. i. 539. Burm. Thes. t. 45 (leaf only). Wight, Ill. t. 75.

A moderate-sized tree, with reddish-grey, rough bark, leaf-scars very large and prominent, young parts glabrous; l. closely placed, spreading, pinnate, rachis 8–10 in., much thickened at base, puberulous, with a leafy wing on either side between the lflts. which is broad at top, narrowing down-

* From the fern-like form of the leaves. It does not appear why Thwaites substituted this name for his earlier one, *Pteridophyllum*, of the same meaning.

wards, lflts. 6–8 pair, opposite or often alternate above, sessile, linear-oblong, acute and unequal at base, emarginate, entire, undulate, glabrous and shining, dotted, lat. veins numerous, parallel; fl. small, numerous, on short ped., in erect, narrow, glabrous, axillary panicles 6–8 in. long; cal. glabrous, persistent, segm. acute; pet. in the male fl. longer than cal., concave, in the fem. fl. very small; disk very hairy; stam. in the male fl. long, exserted, in the fem. fl. very small, barren; ov. globose, glabrous, style short, curved; drupe ovoid, $\frac{1}{2}$–$\frac{5}{8}$ in., apiculate, smooth and shining, purple; seed pendulous.

Forests in the low country; common. Fl. Jan.; pinkish-white.

Also in Malabar; where the Tamil name is given as 'Athalangi.'

Much planted as an ornamental tree. Hermann gives as the Sinhalese names 'Jurighas' and 'Maniglia.' Burmann figures the leaf as a fern; and its outline does a good deal resemble the frond of some *Pteris*, such as *P. umbrosa.* Linnæus corrected this error, but did not attempt to name the plant.

Wood close-grained, heavy, rather hard, pale red. Some fine trees in the Pattipal-ar Forests in Wellasse measured 10 ft. in girth at the level of my chest.

XXXIII.—MELIACEÆ.

TREES, rarely shrubs; l. alternate, compound (unifoliolate in *Walsura Gardneri*), without stip.; fl. regular, bisexual or polygamo-diœcious; cal. 4–5-fid (sep. distinct in *Amoora*); pet. 4 or 5, rarely 3, distinct or rarely connate, imbricate or valvate; stam. 5, 6, 8 or 10, fil. more or less completely connate into a tube (distinct in *Chloroxylon* and nearly so in *Walsura*), free or rarely adnate to cor., inserted outside disk; disk conspicuous or inconspicuous, rarely 0; ov. 2–5-celled, with 2 or rarely numerous ovules in each cell, style simple; fruit a capsule, rarely a drupe or indehiscent, 1–5-celled, with 1–numerous seeds; seed with or without an aril, with or more usually without endosperm.

Seeds not winged.
  Ovules 1–2 in each cell.
    Fil. connate into a tube.
      Pet. connate, and adnate to stam.-tube . 1. MUNRONIA.

Pet. distinct and free.	
Pet. 5.	
Fl. bisexual.	
Fruit a drupe, stone 2–5-celled . .	2. MELIA.
Fruit a drupe, stone 1-celled . .	3. AZADIRACHTA.
Fruit a berry	4. CIPADESSA.
Fl. polygamous	5. AGLAIA.
Pet. 4.	
Disk tubular-cup-shaped . . .	6. DYSOXYLON.
No disk.	7. PSEUDOCARAPA.
Pet. 3	8. AMOORA.
Fil. nearly distinct	9. WALSURA.
Ovules several in each cell. Fr. very large .	10. CARAPA.
Seeds winged.	
Fil. connate into a tube	11. CHICKRASSIA.
Fil. distinct (*Cedreleæ*)	12. CHLOROXYLON.

Of our 14 species none extend upwards out of the low country, except *Aglaia apiocarpa* and *Pseudocarapa*. *Melia*, *Cipadessa*, *Pseudocarapa*, *Aglaia apiocarpa*, *Amoora*, *Chickrassia*, and *Walsura Gardneri* are confined to the moist region; *Azadirachta* and *Chloroxylon* to the dry; the rest occur in both, *Carapa* being a tree of mangrove swamps. Nearly all afford fine timber.

1. MUNRONIA,* *Wight.*

Small undershrubs; l. imparipinnate; fl. few, large, racemose; cal. very deeply 5-cleft; pet. 5, with long claws connate into a tube; staminal tube adnate to cor.-tube below, 10-toothed, anth. 10, alternating with teeth; ov. 5-celled, with 2 superposed ovules in each cell; fruit a loculicidal, 5-valved capsule, the valves also separating from axis; seeds narrowly winged, endosperm scanty.—Sp. 3; 2 in *Fl. B. Ind.*

M. pumila, *Wight*, *Ic.* t. 91 (1840). **Bin-kohomba,** *S.*
Melia pumila, Moon Cat. 35. Wight, Ill. i. 147. Thw. Enum. 59. C. P. 177.
Fl. B. Ind. i. 543. Wight, Ic. t. 91.

A very small shrub, with long, woody roots, stem 4–6 in., unbranched, bark whitish; l. numerous, rather crowded, spreading, pinnate, rachis strongly pubescent, lflts. 1–2 pair and a terminal one, very shortly stalked, oval, unequal at base, acute, entire or coarsely lobed, pubescent above, densely silky beneath, terminal one much largest; fl. 1½–2 in., pedicellate, about 2–4 in., in short, axillary pubescent racemes; sep. linear-oblong, subacute, leafy, hairy, persistent; cor.-tube ¾ in., slender, hairy, lobes oblong-oval, spreading; stam.-tube

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* Named in honour of Lieut. Munro, 39th Foot, afterwards General Munro, C.B., the well-known botanist and authority on Gramineæ.

exserted ½ in. beyond corolla, with 10 spreading, filiform teeth at mouth, anth. almost sessile, erect, bluntly apiculate; ov. pyramidal, style long, hairy, stigma capitate; capsule depressed-globose, ½ in. wide, 5-lobed, hairy; seeds pyriform, narrowly winged, smooth, brown.

Low country in rocky places; common, but not generally abundant in its localities. Moon's station is Wellasse; there are specimens from him, 1819, in Mus. Brit. Fl. April, July, August; white.
Endemic.
An excellent bitter tonic, and used just as Chiretta (*Ophelia Chirata*), with which, indeed, it is often confounded here.

Turræa villosa, Benn. There is a specimen of this in Hermann's Herbarium, but it is not given in Fl. Zeylanica. The plant has only been certainly met with in a few places in S. India, but should be looked for in Ceylon (see Journ. Linn. Soc. xxiv. 155).

2. **MELIA,** *L.*

Trees; l. bipinnate; fl. in panicles; cal. very deeply 5-cleft, imbricate; pet. 5, imbricate; stam.-tube free, with 20 teeth in pairs; anth. 10, alternate with pairs of teeth (*i.e.*, fil. bifid with anth. between teeth); ov. 5-celled, with 2 superposed ovules in each cell, stigma 5-toothed; fruit a drupe, stone bony, 2–5-celled; seeds with very scanty external endosperm. —Sp. 12; 4 in *Fl. B. Ind.*

M. dubia, *Cav. Diss.* vii. 364 (1789). **Lunu-midella,** *S.* **Malai-vémpu,** *T.*
M. Azedarach, Moon Cat. 35 (non L.). *M. composita*, Willd., Thw. Enum. 59. C. P. 699.
Fl. B. Ind. i. 545. Bedd. Fl. Sylv. t. 12 (*M. composita*).

A very large tree, bark smooth, thin, dark purplish-brown, young parts stellate-mealy; l. crowded, very large, 1–3 ft. or more, bi- or somewhat tripinnate, pinnæ 3–6 pair, distant, opposite or nearly so, lflts. 2–5 pair in each pinna and a terminal one, stalked, oval or ovate, slightly oblique at base, acuminate, coarsely shallowly crenate, the lowest often again pinnate, glabrous, rachis cylindrical, glabrous, dilated at base; fl. numerous, in corymbose panicles 4–8 in. long, peduncle axillary, stellate-scurfy; cal.-segm. lanceolate, acute, stellate-mealy; pet. linear-oblong, obtuse, reflexed, stellate-mealy outside, pubescent within; stam.-tube somewhat tapering, hairy within, teeth spreading, filiform, anth. nearly sessile; style long, stigma clavate, 5-toothed; drupe ovoid, 1–1½ in., smooth and shining, yellowish; seeds solitary in each cell, pointed, smooth, brown.

Moist low country; rather common. Fl. Feb.; white.

Also in the Indian Peninsula, and has a wide range through Tropical Asia, Africa, and Australia.

A tree of extremely rapid growth. Wood much used, light, soft, pale brownish-red, with large pores. The outriggers of native boats are always made of this.

M. Azedarach, L., the Indian or Persian Lilac or Bead-tree, is often cultivated. Specimens are in Hermann's Herb., and it is n. 162 in Fl. Zeyl. It is native in Northern India, China, and Persia, and perhaps also in the West Indies (*M. sempervirens*, Sw.).

3. AZADIRACHTA, *A. Juss.*

Trees; l. pinnate. As in *Melia*, but ov. 3-celled, with 2 collateral ovules in each cell, stigma 3-lobed; stone of drupe 1-celled, 1-seeded; no endosperm.—Monotypic.

A. indica, *A. Juss. in Mém. Mus.* xix. 221 (1830). **Kohomba,** *S.* **Vémpu,** *T.*

Burm. Thes. 40. Fl. Zeyl. n. 161. *Melia Azadirachta*, L. Sp. Plant. 385. Moon Cat. 35. Thw. Enum. 59. C. P. 1159.

Fl. B. Ind. i. 544 (*Melia Azadirachta*) (not given for Ceylon). Wight, Ic. t. 17. Burm. Thes. t. 15.

A tall tree, with straight trunk and long, spreading branches, bark brown, rugged, young parts glabrous; l. rather crowded, pinnate, rachis 6–9 in., glabrous, lflts. 2–8 pair and a terminal one, opposite or alternate, very shortly stalked, 2–4 in., lanceolate-falcate, very unequal-sided, oblique at base, alternate, coarsely dentate-serrate, glabrous, pale green; fl. small, in lax, narrow, axillary panicles 5–8 in. long; sep. rounded, finely ciliate; pet. spathulate-oblong, ciliate; stam.-tube dilated above, hairy within, teeth truncate, trifid, recurved, anth. small, erect; drupe oblong-ovoid, $\frac{5}{8}$–$\frac{3}{4}$ in., blunt, smooth, dark purple; pulp scanty, endocarp bony; seed solitary.

Dry country, common; planted elsewhere in Ceylon. Fl. March–May; white, sweet-scented.

Also throughout India.

This tree is generally known by its Portuguese name, 'Margosa.' In India it is called 'Nim.' Wood moderately heavy, very hard, dark red, with large pores. The bark is astringent and bitter, and used as a febrifuge and tonic. The oil from the seeds, Kohomba-tel, is a universal external application for rheumatism, &c., and as an insecticide. Thw. states that the juice of the leaves, which is very bitter, is used as an anthelmintic for cattle.

Stands drought well, and much planted as an avenue and roadside tree in the Jaffna district.

M. parviflora, Moon, is erroneously cited for this in Fl. B. Ind.

4. **CIPADESSA,*** *Bl.*

Shrubs or trees; l. imparipinnate; fl. in axillary panicles; cal. 5-toothed; pet. 5, valvate; stam. 10, fil. coherent only at base, bifid at apex with anth. between teeth; ov. 5-celled, with 2 collateral ovules in each cell; fruit a small berry, 5-celled; seeds 1 or 2 in each cell, with fleshy endosperm.—Sp. 4; 1 in *Fl. B. Ind.*

C. fruticosa, *Bl. Bijd.* 162 (1850). **Hal-bembiya,** *S.*
Melia parviflora, Moon Cat. 35. *Mallea Rothii,* A. Juss.; Thw. Enum. 60. C. P. 496.
Fl. B. Ind. i. 545. Bedd. Fl. Sylv., t. anal. 8., f. 5 (fls. only).

A small, much-branched shrub, young parts silky; l. not crowded, pinnate, rachis 4–10 in., glabrous, lflts. 2–3 pair and a terminal one, opposite, shortly stalked, oval, acute at both ends, very coarsely serrate, finely hairy on the veins on both sides; fl. small, in long-stalked, axillary, corymbose panicles 3–4 in. long; cal. hairy, teeth acute; pet. narrowly oval, hairy outside, spreading; fil. hairy within, teeth of fil. sharp, as long as anth.; style short, stigma capitate, 5-lobed; berry small, under $\frac{1}{4}$ in., globose, 5-lobed, juicy, scarlet; seeds angular.

Low country, up to 2000 ft.; very common. Fl. Jan., Feb.; white.
Also in Southern India and Java.
Liable to be confused with *Brucea sumatrana,* which, however, has the leaves much more silky with yellow hairs.

5. **AGLAIA,** *Lour.*

Trees; l. imparipinnate; fl. small, globose, polygamo-diœcious; cal. deeply 5-lobed, imbricate; pet. 5, imbricate; stam.-tube subglobose, nearly entire at mouth, anth. 5, included; ov. 2-celled, style very short; fruit a fleshy, 1-celled berry, pericarp thin; seed solitary or 2, with a thick, succulent testa; cotyledons thick, entire or 2-lobed, no endosperm.—Sp. 59; 14 in *Fl. B. Ind.*

L. densely scaly beneath; fr. 1 in diam. . . 1. A. APIOCARPA.
L. glabrous beneath; fr. under $\frac{3}{4}$ in. diam. . . 2. A. ROXBURGHIANA.

1. **A. apiocarpa,** *Hiern in Fl. B. Ind.* i. 555 (1875).
Milnea apiocarpa, Thw. Enum. 60. Cas. DC. in Mon. Phan. i. 620. C. P. 405.
Fl. B. Ind. i. 555.

A small tree, the young parts covered with minute, dark-brown scales; l. pinnate, variable in size, rachis 3–8 in., lflts.

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* *Cipadessa,* the Malay name.

2–3 pair and a terminal one, oval or lanceolate or oblong-lanceolate, 2–7 in., acute or tapering at base, acuminate, entire, glabrous above, more or less densely covered with minute coppery scales beneath; fl. in lax, ferruginous-scaly, somewhat supra-axillary panicles, the male smaller and more numerous, ped. as long as fl.; berry at first pyriform, nearly globular when ripe, 1 in., smooth, orange-coloured; seed solitary, cotyledons divided nearly to the base into 2 unequal lobes.

Moist region, principally in the lower montane zone; rather common. Adam's Peak; Maturata; Ambagamuwa; Ramboda; Hiniduma Kande; Rangala. Fl. Jan., Feb.; yellow.

Endemic.

A variety with narrow leaflets, very coppery beneath, was met with in the Rangala district on the way to Nitre Cave.

I doubt if this be really distinct from *A. Roxburghiana;* the principal differences are the greater amount of the covering of coppery scales, and the larger fruit; the ped of the fl. also is somewhat longer.

2. **A. Roxburghiana,** *Miq. Ann. Mus. Lugd.-Bat.* iv. 41 (1868). **Kannakompu,** *T.*

Fl. Zeyl. n. 442 (*Panaghas*). *Milnea Roxburghiana*, W. and A., Thw. Enum. 60. C. P. 1148.

Fl. B. Ind. i. 555. Wight, Ic. t. 166 (*Milnea*). Bedd. Fl. Sylv. t. 130.

A moderate or large tree, much branched, bark thin, smooth, dull greyish-orange, young parts covered with minute ferruginous scales; l. pinnate, rachis 2–4 in., cylindrical, smooth, lflts. usually 2 pair and a terminal one, shortly stalked, $2\frac{1}{2}$–4 in., oval, acute or tapering at base, obtuse, entire, somewhat undulate, glabrous on both sides, paler beneath; fl. small, the male numerous, in pyramidal, spreading panicles exceeding the l., the bisexual few, in short racemes, peduncle slightly supra-axillary, lepidote; pet. orbicular, very concave; stam.-tube truncate, thickened below each sessile anth.; berry $\frac{5}{8}$–$\frac{3}{4}$ in., broadly ovoid or pyriform, gibbous at base, minutely rusty-pilose, pale orange-coloured, pericarp thin, brittle-coriaceous; seeds 1 (or 2), ovoid, testa white, thick, pulpy, embryo green, cotyledons very thick, not readily separable, externally lobulated.

Low country, common in the dry region, and rather common in the moist region up to a little over 2000 ft. Fl. July; yellow.

Also in Southern India and Malaya generally.

Wood hard, heavy, smooth, close, brown. The Sinhalese wood-cutters in the E. Prov. call this 'Kirikon,' a name which properly belongs to *Walsura Piscidia*, which possesses a fruit externally very similar. The pulpy covering of the seed is edible and slightly acid. Though very like an aril in appearance, it is really a part of the testa and quite inseparable from the very thin brown skin covering the embryo.

Aglaia odorata, Lour., of Malaya and China, is occasionally cultivated. Macrae's Ceylon specimens quoted by Cas. DC. (Mon. Phanerog. i. 602) were no doubt from the Botanic Gardens.

6. **DYSOXYLUM,*** *Bl.*

Trees; l. imparipinnate; fl. in supra-axillary panicles; cal. truncate, obscurely 4-lobed; pet. 4, valvate; stam.-tube 8-lobed at mouth, anth. 8, included; disk conspicuous, tubular-cup shaped, as long as ov.; ov. 4-celled; fruit a large, coriaceous, sub-dehiscent capsule, 4- (or 5-) celled, with 1 seed in each cell; no endosperm, cotyledons plane-convex.—Sp. 85; 14 in *Fl. B. Ind.*

D. binectariferum, *Hk. f. in Trans. Linn. Soc.* xxv. 212 (1866). Cas. DC. l. c. 493. *D. macrocarpum*, Thw. Enum. 60 (non Bl.). C. P. 2637.

Fl. B. Ind. i. 546. Bedd. Fl. Sylv. t. 150 (from Ceylon specimens).

A large tree, with straight trunk, young parts puberulous; l. pinnate, rachis 6–9 in., angular, very finely puberulous, lflts. 5–9, alternate, 5–7 in., shortly stalked, oval, acute and often unequal at base, acuminate, entire, glabrous, thick, not shining; fl. under ½ in., few, on short, pubescent, articulated ped., in narrow, erect, supra-axillary panicles 3–5 in.; cal. cup-shaped, truncate, obscurely lobed; pet. triangular, acute, spreading or reflexed, puberulous outside; stam.-tube wide, somewhat 4-angled, crenulate, anth. sessile, within the tube; disk closely surrounding ovary; style equalling stam.-tube; capsule 2–2½ in., depressed-globular, deeply 4- (or 5-) grooved, smooth, orange-coloured, pericarp thick, coriaceous-fleshy, indehiscent or tardily loculicidal; seeds solitary in each cell, large, nearly 1 in., chestnut-coloured, shining.

Var. β. **pyriforme,** *Trim.* C. P. 3596.

Lflts. much smaller, 3–4 in., oblong, thinner, much reticulate, with prominent veins; fr. much smaller, 1–1¼ in., pyriform.

Low country, principally in the moist region up to 3000 ft.; rather common. Var. β. in the dry country at Batticaloa. Fl. Jan.–March; green.

Also in Southern India and Assam.

C. de Candolle in his monograph of the Order (Mon. Phan. i. 493) has a var. *punctulatum* from Ceylon, with the leaves thickly pellucid-

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* From the disagreeable scent of the wood and bark of *D. alliaceum* of Java, the first species described. Our species does not possess it.

punctate; he quotes for this C. P. 2639, which, however, must be an error, as that number is a *Hedyotis*. He calls the ordinary Ceylon plant var. *coriaceum*.

Wood hard, moderately heavy, close-grained, reddish.

7. **PSEUDOCARAPA,*** *Hemsl.*

Tree; l. abruptly pinnate; fl. in racemose panicles; cal. obscurely 4-lobed; pet. 4, nearly valvate; stam.-tube shallowly crenate at mouth, anth. 8, included; no disk; ov. 4-celled, with 2 collateral ovules in each cell; style as long as stam.-tube, stigma small, capitate; fruit a 4-celled capsule, tardily dehiscent, with 4 valves; seeds 1 or 2 in each cell, half surrounded by a fleshy aril; no endosperm.—Monotypic.

P. Championi, *Hemsl. in Ic. Plant., ser.* 3, v. 46 (1884). **Gonapana,** *S.* [PLATE XXIV.]

Dysoxylum Championii, Hk. f. and Th., Thw. Enum. 61. *Amoora* (?), B. and Hk. f., Enum. 409; Cas. DC. l. c. 591. C. P. 1193, 2504.

Fl. B. Ind. i. 562 (*Amoora ?*). Hook. Ic. Pl. t. 1458.

A very large tree, bark roughish, grey, young parts slightly puberulous; l. pinnate, rachis 2–4 in., cylindrical, glabrous, lflts. 2–3 pair, opposite, on short stalks, obovate-oblong, $2\frac{1}{2}$–$4\frac{1}{2}$ in., tapering at base, very obtuse, entire, glabrous; fl. rather large, $\frac{5}{8}$ in., in small, supra-axillary, racemose panicles; cal. shallowly cup-shaped; pet. oval-oblong, acute; stam.-tube somewhat inflated, with 8 bilobed crenulations at mouth, anth. small, included; capsule $\frac{3}{4}$–1 in., globose-pyriform, apiculate, smooth; seeds $\frac{1}{2}$ in., ovoid, half covered by the reddish aril, testa smooth, brown.

Moist region from 1000–4000 ft.; rather rare. Hantane; Deltota; Hunasgiriya; Dikoya; W. Prov. Fl. Jan.; yellow.

Endemic.

Hemsley (l. c.) describes and figures 9 anthers. I have never found more than 8, as Thwaites describes them.

Wood very hard and heavy, close-grained, reddish.

8. **AMOORA,**† *Roxb.*

Trees; l. imparipinnate; fl. polygamous, in lax spikes; sep. 5, imbricate; pet. 3, strongly imbricate; stam.-tube globular, nearly entire at mouth, anth. 6, nearly included; ov. 3-celled, with 2 superposed ovules in each cell; fruit a 3-celled capsule, loculicidally dehiscent, with 3 valves; seeds

* From the remarkable similarity of the foliage to *Carapa moluccensis*.

† From the Bengalese name of *A. cucullata*.

3 or less, suspended, completely enveloped in fleshy aril, embryo homogeneous, no endosperm. — Sp. 27; 11 in *Fl. B. Ind.*

A. Rohituka,* *W. and A. Prod.* 119 (1834). **Hingul,** *S.*
Thw. Enum. 60. C. P. 558, 2479.
Fl. B. Ind. i. 559. Bedd. Fl. Sylv. t. 132 (?).

A moderate-sized tree, with straight trunk, drooping branches and smooth, thin bark, young parts finely silky; l. large, pinnate, spreading, rachis 1–2½ ft., cylindrical, thickened at base, lflts. 6–8 pair and a terminal one, opposite, stalked, 3–5 in., unequal at base, acuminate, obtuse, glabrous on both sides, terminal one smallest; fl. sessile, distant, the male numerous, small, on the spicate branches of large, spreading, supra-axillary panicles, the fem. fewer, twice as large, in long, drooping spikes; sep. rotundate, downy, ciliate; pet. rotundate, very thick, concave; ov. 3-lobed, pilose, stigma sessile, large, trigonous; capsule 1 in., nearly globose or somewhat pyriform, smooth, red, valves thick, fleshy, spongy within; seeds 1 in., broadly ovoid, apiculate, aril fleshy, yellow, testa smooth, shining, purplish-brown, marked along ventral side with raised fibrous raphe.

Moist region, up to about 3000 ft.; rather rare. Hantane; Maturata; near Ekiriyankumbura, Uva (?). Fl. July, August; yellow.

Also on Malabar coast, E. Bengal, Malaya, and Andaman and Philippine Is.

The young leaves are purple. Beddome's figure above quoted shows the flowers on longish pedicels, and may be different.

Wood hard, close-grained, dark red.

9. WALSURA,† *Roxb.*

Trees; l. 1–3-foliolate; fl. bisexual, in paniculate cymes; cal. 5-lobed or -toothed; pet. 5, nearly valvate; stam. 10, fil. distinct nearly to the base; disk large, annular, tumid; ov. sunk in the disk, 2-celled, with 2 collateral ovules in each cell, style very short, stigma large, turbinate-capitate; fruit indehiscent, 1-celled, pericarp thin, brittle; seed usually solitary, more or less completely enveloped in aril, cotyledons plane-convex, no endosperm.—Sp. about 10; 8 in *Fl. B. Ind.*

* The Sanskrit name for the tree.
† Given by Roxburgh as the Tamil name for *W. Piscidia.*

Leaves uni-foliolate . . . . 1. W. GARDNERI.
Leaves tri-foliolate . . . . 2. W. PISCIDIA.

1. **W. Gardneri,** *Thw. Enum.* p. 61 (1858).
Thw. Enum. 61. C. P. 1163.
Fl. B. Ind. i. 563.

A small tree, 10–20 ft., young parts glabrous; l. unifoliolate, 3–6 in., oval or lanceolate, acute at base, acuminate, entire, glabrous, petiole $\frac{3}{4}$–1 in.; fl. in small, short, dense, paniculate cymes on extra-axillary peduncles shorter than the l.; cal.-teeth short, acute; pet. oblong-oval, apiculate; fil. distinct almost or quite to base, contiguous, flat, hairy within; fruit 1–1$\frac{1}{4}$ in., fusiform-ovoid, beaked, finely tomentose, dull orange; seed nearly covered by the white aril, filling the fruit.

Moist region at about 2000–3000 ft.; rather rare. Hantane; Allagala; summit of Ritigala. Fl. Feb., March; white.
Endemic.

2. **W. Piscidia,*** *Roxb. Hort. Beng.* 32 (1814). **Kiri-kon, Molpetta,** *S.* **Chadavakku,** *T.*
Thw. Enum. 61. C. P. 1162.
Fl. B. Ind. i. 564. Wight, Ill. t. 55.

A small or moderate-sized tree, bark light-brown, vertically cracked, rather thick, young parts glabrous; l. 3-foliolate, rachis stiff, glabrous, brown, lflts. 1$\frac{1}{2}$–3 in., stalked, oblong-oval, acute at base, obtuse, entire, glabrous, pale and finely reticulate beneath; fl. $\frac{1}{3}$ in., on short ped., in small, rather dense, long-stalked, pubescent, axillary or terminal, paniculate cymes, as long as or longer than the l.; cal.-lobes acute, pubescent; pet. pubescent outside; fil. slightly connate at base, broad, flat, hairy inside, anth. terminal, apiculate; fr. $\frac{3}{8}$–$\frac{1}{2}$ in., broadly ovoid, minutely apiculate, finely tomentose, bright orange-yellow; seed usually solitary, completely enveloped in white, juicy aril, testa pale brown, with prominent raphe down ventral side.

Var. β. **acuminata,** *Trim.* *W. Thwaitesii,* Cas. DC. l. c. 635.

Lflts. larger, more or less (often very) acuminate; fruit larger, $\frac{7}{8}$ in.

Low country; very common in the dry region; var. β. in Ambagamuwa and other parts of the moist region. Fl. March; pinkish-white.
Also in Malabar and Travancore; var. β. endemic (?).
Varies much in appearance and character of foliage. The pulpy aril of the seed is edible and pleasant. Wood hard, heavy, close-grained, dark reddish-brown.

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* *Piscidia* from the use of the bark as a fish-poison.

10. CARAPA, *Aubl.*

Trees; l. abruptly pinnate; fl. in small panicles; cal. 4-fid; pet. 4; stam.-tube depressed-globose, with 8 bi-dentate lobes at the mouth, anth. 8, just included; disk large; ov. immersed in disk, 4-celled, with several ovules in each cell, style short, stigma capitate; fruit a very large 1-celled, 4-valved capsule; seeds 6–12, very large, no endosperm.—Sp. 6; 1 in *Fl. B. Ind.*

C. moluccensis, *Lam. Encycl. Méth.* i. 621 (1763).
Xylocarpus Granatum, Koen., Thw. Enum. 61. C. P. 2650.
Fl. B. Ind. i. 567. Bedd. Fl. Sylv. t. 136.

A moderate-sized tree, perfectly glabrous throughout; l. pinnate, rachis cylindrical, brown, lflts. 1 or 2 pair, nearly sessile, opposite, articulated, $2\frac{1}{2}$–4 in., obovate-oblong, entire, shining, pale green; fl. $\frac{5}{8}$ in., few, in small, apparently terminal panicles; cal.-teeth broadly triangular; pet. spreading or reflexed; disk large, turbinate, glabrous; fr. $3\frac{1}{2}$–6 in., globose, 4-grooved, smooth, brown, valves woody, $\frac{1}{4}$ in. thick; seeds variously angular from mutual pressure, pink, testa very thick, dry-spongy.

Mangrove swamps on the west coast; rather rare. Chilaw; Negombo; Colombo. Fl. September, December; pinkish-yellow.

On the Tropical shores of Asia, Africa, and N. Australia.

This is called the 'Cannon-ball' tree from its great spherical hard fruits. I have the Sinhalese name 'Mudu-nelun' for it from Mr. Nevill, but it is generally reckoned with the Mangroves and called, like them, 'Kadol.'

[*Soymida febrifuga*, A. Juss., is given in Fl. B. Ind. i. 567, for Ceylon on the faith of a specimen in Herb. Kew from Jaffna collected by Dyke. This was doubtless cultivated there (as were many other foreign trees) by Mr. Dyke. This tree is also included in Moon's Catalogue, p. 34, the locality given being 'Saffragam' and the native name 'Kokun.' Moon may have confounded *Kokoona zeylanica* with *Soymida*, and there is a specimen of the former from him collected in 'Saffragam 1820' in Herb. Perad. But there are also specimens, in leaf only, from Moon, collected at Kalutara in 1821, which may be truly *Soymida*. If so, they were probably cultivated in the old Botanic Gardens there.]

11. CHICKRASSIA,* *A. Juss.*

Large trees; l. imparipinnate; fl. in terminal panicles; cal. 4- (or 5-) lobed; pet. 4 (or 5), slightly contorted; stam.-tube cylindrical, almost entire at mouth, anth. 8 (or 10), terminal; ov. 4- (3–5-) celled, ovules very numerous, style

* From Chickrassi, the Bengali name. Jussieu spells it *Chukrasia.*

long, stout; fruit a woody capsule, septicidally dehiscent by 4 (3–5) valves; seeds very numerous, with a large wing, no endosperm.—Monotypic.

C. tabularis, *A. Juss. in Mém. Mus.* xix. 251 (1830). **Hulanhik,** *S.* **Aglai, Kaloti,** *T.*

C. velutina, Roem., Cas. DC. l. c. 727. Thw. Enum. 61. C. P. 2454. Fl. B. Ind. i. 568. Wight, Ill. t. 56. Bedd. Fl. Sylv. t. 9.

A very large tree, with a tall, straight trunk, bark brown, deeply vertically cracked, young parts pubescent; l. pinnate, rachis 8–10 in., cylindrical, softly tomentose, lflts. 10–16, usually 12, stalked, alternate, $2\frac{1}{2}$–5 in., ovate, very unequal at base, acuminate, acute, entire, closely velvety-tomentose on both sides, dark green above, paler beneath; fl. $\frac{7}{8}$–1 in., pedicellate, in large, terminal, pyramidal panicles; cal.-lobes shallow, rounded, hairy; pet. linear-oblong, spreading; stam.-tube $\frac{1}{4}$ in., style as long as stam.-tube; capsule $1\frac{1}{4}$ in., broadly ovoid, apiculate, smooth, brown, valves woody, separating entirely from the 4-winged axis; seeds closely packed, compressed, with a broad, obtuse, terminal wing twice as long as themselves.

Low country; rather rare (?). Deltota; Hanguranketa; Kandy. Fl. May; pale green.

Also at Bombay and on the Malabar coast, and at Malacca.

Our plant is the variety with the leaves silky-tomentose, which is *C. velutina*, Roem., and is maintained as distinct from *C. tabularis* by Cas. DC. in his monograph (l. c. p. 727). I have only seen 4-merous fl., but in Fl. B. Ind. the anth. are given as 10 and the ov. and capsule 3-celled, and in Wight and Beddome's figure the ov. is 5-celled.

Wood hard, rather heavy, even, shining, brownish red, with rather large pores, durable. Much valued, and goes by the name of 'Chittagong wood' and 'White cedar' at Madras. The finely carved pillars in the audience-hall (now District Court) at Kandy are made of it.

Cedrela Toona, Roxb., a tree common throughout India, Burma, &c., is curiously absent from Ceylon. It has, however, been introduced and planted on tea estates. There are figures in Wight, Ic. t. 161 and Bedd. Fl. Sylv. t. 10. *C. serrata*, Royle, native of the Himalaya, has also been a good deal planted on estates in the hills, where it is called the 'Red Toon.' These distinct species are combined in Fl. B. Ind.

12. CHLOROXYLON, *DC.*

Tree; l. imparipinnate; fl. in terminal panicles; cal. deeply 5-lobed; pet. 5, clawed, imbricate; stam. 10, quite distinct; disk large, tumid, 10-lobed; ov. 3-celled, with many ovules in each cell, style short; fruit a coriaceous, 3-celled

capsule, loculicidally 3-valved; seeds numerous, with a long wing, no endosperm.—Monotypic.

C. Swietenia, *DC. Prod.* i. 625 (1824). **Buruta,** *S.* **Mutirai,** *T.*
Swietenia Chloroxylon, Roxb., Moon Cat. 34. Thw. Enum. 61. C. P. 1160.
Fl. B. Ind. i. 569. Wight, Ill. t. 56 bis, cop. in Bedd. Fl. Sylv. t. 11.

A moderate-sized tree, bark very rough, deeply furrowed, branchlets smooth, purplish, lenticellate, young parts with orange puberulence; l. pinnate, spreading or reflexed, rachis 4–8 in., cylindrical, puberulous, lflts. 18–30 or more, alternate or opposite, shortly stalked, very unequal-sided, oblong, obtuse, entire, glabrous, dull blueish-green, paler and minutely gland-dotted beneath; fl. $\frac{3}{8}$ in., pedicellate, in small, pyramidal, pubescent, terminal panicles; cal.-lobes small, oval, obtuse; pet. with a short claw and ovate, acute blade sagittate at base; stam. inserted between lobes of disk, shorter than pet., anth. versatile; disk pubescent; ov. sunk in the disk, 3-lobed; capsule nearly 1 in., oblong-ovoid, obtuse, glabrous; seed with wing $\frac{3}{4}$ in., angular, compressed, wing linear-oblong, obtuse.

Dry region; common. Fl. April–June; cream-coloured.
Also in Southern India.
The timber is the well-known 'satin-wood;' very hard, heavy, fine-grained, yellow, with a satiny lustre. It is difficult to work, but good for turning, and is the principal timber exported from Ceylon. The best satin-wood forests are in the Batticaloa and Puttalam Districts, and there are also some good ones near Anuradhapura.

XXXIV.—CHAILLETIACEÆ.

Trees or shrubs; l. alternate, simple, with persistent stip.; fl. regular or nearly so, polygamous; sep. 5, unequal, imbricate; pet. 5, distinct, 2-lobed, with a small scale at base (? disk), narrow; stam. 5, distinct; ov. 2-celled, with 2 pendulous ovules in each cell, styles distinct; fruit 2-valved, with a hard, didymous, 2-seeded stone; embryo large, no endosperm; cotyledons thick, plane-convex.

CHAILLETIA, *DC.*

For characters, see Order.—Sp. 30; 6 in *Fl. B. Ind.*

C. sumatrana, *Miq. Fl. Ind. Bot. Suppl.* 328 (1860). **Balunakuta,** *S.*
Moacurra gelonioides, Roxb., Thw. Enum. 79. C. P. 1245, 1231.
Fl. B. Ind. i. 570 (*C. gelonioides*). Bedd. Fl. Sylv. t. anal. vi. f. i. (fls. only).

A bush or small tree, young parts pubescent, twigs slender; l. 2–5 in., variable, usually oval or oblong-oval, acute or tapering to base, acuminate, acute, entire or with a few large teeth in upper part, glabrous, rather thick, paler and reticulate with prominent veins beneath, petiole very short, bristly, stip. small, unequal, setaceous, pubescent, persistent; fl. small, pedicellate, in small axillary or extra-axillary clusters; sep. very obtuse, concave, pubescent; pet. a little longer than sep., oblong-linear, deeply bifid, connective dilated; ov. woolly, styles 2, very short; fruit $\frac{5}{8}$ in., orbicular, didymous, compressed, pubescent, grey-green, epicarp coriaceous, 2-valved, splitting along the edge, stone thin, hard, rugose outside, completely covered by a soft scarlet coat (mesocarp), testa thin, pale brown.

Moist low country up to 3000 ft.; common. Fl. March; pale green.
Also in East Bengal, the Malabar coast, and Sumatra.
The leaves are sometimes hairy beneath, and the plant is then var. β. Thw. (C. P. 1231 from Galle and Ratnapura).
Very Euphorbiaceous in aspect, and much like some species of *Cleistanthus.*

XXXV.—OLACINEÆ.

Trees or shrubs, sometimes climbing; l. alternate, simple, without stip.; fl. small, regular, bisexual or rarely diœcious; cal. usually small, 4–5-lobed, or obsolete; pet. 4 or 5, distinct or coherent into a tube, valvate or imbricate; stam. 3, 4, 5, 8 or 10, often with staminodes, opposite to or alternate with pet., distinct, free or rarely adnate to pet. at base; disk annular or cup-shaped (large and epigynous in *Strombosia*); ov. (inferior in *Strombosia*) 1–5-celled, with 1 or 2 pendulous (erect in *Cansjera*) naked ovules in each cell; fruit a drupe,

with a hard, woody or crustaceous stone, 1-celled, 1-seeded; embryo with usually leafy cotyledons, endosperm copious, fleshy.

Fl. bisexual (exc. some in *Gomphandra*).
  Stam. 8 or 10 . . . . 1. XIMENIA.
  Stam. 3, with 5 staminodes . . . . . . 2. OLAX.
  Stam. 4 or 5, opp. pet.
    Dichlamydeous, stam. 5.
      Stam. adnate to pet. (ov. inferior). . . . 3. STROMBOSIA.
      Stam. free (with 5 staminodes) . . . . 4. OPILIA.
    Monochlamydeous, stam. 4 (with 4 staminodes) 5. CANSJERA.
  Stam. 4 or 5, alternate with pet. (*Icacineæ*).
    Pet. glabrous inside.
      Fil. strongly bearded at top, stigma minute. 6. LASIANTHERA.
      Fil. slightly glandular-hairy at top; stigma large, disciform; pet. connate . . . . 7. GOMPHANDRA.
      Fil. glabrous; style lateral; pet. distinct . 8. APODYTES.
    Pet. hairy inside . . . . 9. MAPPIA.
Fl. unisexual, diœcious, monochlamydeous (*Phytocreneæ*). . . . . 10. PYRENACANTHA.

Most of the 13 species are restricted to the low country, *Ximenia*, *Pyrenacantha*, and *Olax scandens* being confined to the dry region, whilst *O. zeylanica*, *Strombosia*, *Opilia*, *Lasianthera*, *Gomphandra axillaris*, and *Mappia* occur only in the moist. The two last ascend into the mountain zone, to which, however, *Gomphandra coriacea* and *Apodytes* alone are restricted.

1. XIMENIA, *L.*

Shrubs or small trees; fl. in small racemes; cal. small, cup-shaped, 4- or 5-toothed; pet. 4 (or 5), covered inside with long hair; stam. 8 (or 10), anth. long, linear; ov. 4-celled, with a solitary pendulous ovule in each cell; fruit a drupe, stone 1-celled, 1-seeded.—Sp. 5; 1 in *Fl. B. Ind.*

X. americana, *Willd. Sp. Pl.* ii. 338 (1799). **Chiru-illantai,** *T.*
C. P. 2382.
Fl. B. Ind. i. 574.

A small tree or shrub, much branched, young parts glabrous; l. 1–2 in., often closely placed on short lateral twigs, oval, obtuse at both ends, minutely apiculate, entire, glabrous, petiole $\frac{1}{6}$ in.; fl. $\frac{3}{8}$ in., shortly pedicellate, in small short-stalked racemes of 3 from the ends of the lateral twigs, buds acute; cal. glabrous; pet. oblong, revolute; stam. as long as pet.; ov. glabrous, style as long as stam.; fr. $\frac{3}{4}$ in., ovoid, apiculate, glabrous.

Dry country; apparently very rare. Trincomalie; Batticaloa (Capt. A. Walker). Fl. Sept.; white.

Found throughout Tropical Asia, Africa, and America.

I have very scanty material for the description of this plant; the C. P. specimens are without flowers, and the species is not given in Thw. Enum. The leaves turn black in drying.

2. **OLAX,** *L.*

Shrubs or small trees, usually climbing; fl. in racemes or panicles; cal. minute, truncate, cup-shaped, very greatly enlarged in fruit; pet. 5, more or less coherent into a tube; fertile stam. 3, inserted at base of pet.; staminodes 5, inserted with stam., usually bifid; ov. surrounded by a small cup-shaped disk, 1-celled above, 3-celled below, ovules 3, pendulous from top of central placenta, style long; fruit drupaceous, more or less covered by the greatly enlarged cal., stone 1-celled, 1-seeded; embryo minute in axis of endosperm.—Sp. about 30; 7 in *Fl. B. Ind.*

Climbers.
  Branches pubescent; fl. $\frac{1}{4}$ in. long . . . 1. O. SCANDENS.
  Branches glabrous; fl. $\frac{1}{2}$ in. long . . . . 2. O. WIGHTIANA.
Erect . . . . 3. O. ZEYLANICA.

1. **O. scandens,** *Roxb. Cor. Pl.* ii. 2 (1798). **Kaḍalṛan̈chi,** *T.*
Moon Cat. 5. Thw. Enum. 42. C. P. 1216.
Fl. B. Ind. i. 575. Roxb. Cor. Pl. ii. t. 102.

A climbing shrub, with strong, slightly curved prickles on the old wood only, much branched, branches cylindrical, more or less pubescent; l. $1\frac{1}{2}$–$2\frac{1}{2}$ in., oval or oblong-oval, obtuse at both ends, entire, glabrous above, glabrous or pubescent beneath, petiole $\frac{1}{6}$ in., pubescent; fl. $\frac{1}{4}$ in., shortly pedicellate, in axillary, pubescent racemes less than 1 in. long, bracts ovoid, as long as ped., caducous, buds ovoid; cal. finely ciliate; pet. more or less connate, linear, acute, recurved; ov. glabrous, tapering, style half as long as pet.; drupe globose, $\frac{3}{8}$ in., apiculate, covered, except at top, by greatly enlarged membranous cal.

Dry region; rather common. Jaffna; Trincomalie; Anuradhapura; Puttalam. Fl. August; white.

Also in India, Burma, and Java.

The flowers are very sweet-scented.

2. **O. Wightiana,** *Wall. Cat.* n. 6779 (1828).
O. psittacorum, Vahl Enum. ii. 33 (partly). Thw. Enum. 42. C. P. 1215.
Fl. B. Ind. i. 575. Bedd. Fl. Sylv. t. anal. ix. f. 2 (fls. only).

A very large climbing shrub, much branched, young parts glabrous; l. 3–5 in., oblong-oval, acute at base, acuminate,

subacute or obtuse, entire, glabrous and shining, petiole $\frac{3}{8}$ in., glabrous; fl. numerous, $\frac{1}{2}$ in., ped. glabrous, $\frac{1}{2}$ in., in lax, divaricate, axillary panicles, bracts deciduous, buds clavate, blunt; cal. minute, glabrous; pet. narrowly linear, somewhat coherent but readily separable, spreading at the ends; stam. and staminodes as long as pet., somewhat exserted; drupe $\frac{5}{8}$–$\frac{3}{4}$ in., broadly ovoid, apiculate, loosely enclosed, except at top, by the greatly enlarged cal., orange-yellow.

Low country; rather rare. Hunasgiria; Hanguranketa; near Kalawewa; Hiniduma; near Nalande. Fl. Feb., March; cream-coloured.

Also Malabar Coast and Malacca.

A handsome climber, covering large trees.

Vahl (l. c.) quotes Koenig as the authority for *O. psittacorum* in Ceylon. I cannot, however, find with certainty Koenig's specimen in Mus. Brit. The original *O. psittacorum* (*Fissilia*, Lam.) is from Mauritius, and a different plant.

3. **O. zeylanica,** *L. Sp. Pl.* 34 (1753). **Mélla,** *S.*

Herm. Mus. 13. Burm. Thes. 26. Fl. Zeyl. n. 34. Moon Cat. 5. Thw. Enum. 42. C. P. 1214.

Fl. B. Ind. i. 576.

A small tree, young branches acutely angled, finely ridged transversely, glabrous, yellow; l. 2–3 in., ovate-oblong, acute at base, attenuate to acute or obtuse apex, entire, rather thick, glabrous and shining, petiole very short; fl. $\frac{1}{4}$ in., few, pedicellate, in very small axillary racemes, buds slightly clavate, blunt; pet. oblong; stam. and staminodes rather shorter than pet.; drupe $\frac{3}{8}$ in., broadly ovoid, strongly apiculate, smooth, scarlet, less than half covered by the cup-shaped, enlarged cal.

Moist low country; common. Fl. April.

Endemic.

The leaves are eaten as a salad.

3. STROMBOSIA, *Bl.*

Trees; fl. in axillary fascicles; cal. with a fleshy tube, limb 5-toothed; pet. 5, distinct, inserted on cal.-tube, hairy within; stam. 5, opp. pet. and adnate to them; ov. *inferior*, completely adnate to cal.-tube, 5-celled, with 5 ovules pendulous from central placenta; disk large, *epigynous*, fleshy, tapering upwards round base of the style; fruit an inferior drupe, stone 1-celled, 1-seeded, embryo minute, at summit of fleshy endosperm.—Sp. 6; 2 in *Fl. B. Ind.*

S. zeylanica, *Gardn. in Calc. Journ. Nat. Hist.* vi. 350 (1845).

S. javanica, Thw. Enum. 42 (non Bl.). *Lavallea ceylanica*, Baill. Adansonia, ii. 361. C. P. 1237.

Fl. B. Ind. i. 579. Bedd. Fl. Sylv. t. 137 (not good).

A moderate-sized or large tree, with erect, straight trunk and drooping branches, bark smooth, yellowish, rather thin, young parts glabrous; l. 4–6 in., lanceolate, often unequal-sided, acute at base, shortly acuminate, acute, entire, rather thick, glabrous and shining, paler beneath, lat. veins oblique, petiole $\frac{1}{2}$ in., glabrous; fl. small, nearly sessile, in small axillary fascicles; cal.-tube glabrous, campanulate; pet. erect, oblong, glabrous outside, hairy within; anth. appearing as if sessile in centre of pet.; fr. oblong-ovoid or sub-pyriform, $\frac{3}{4}$–1 in., crowned when young by persistent limb of cal., smooth or slightly worted.

Upper zone of moist low country; rather rare. Hantane; Watagoda; Gangaruwa. Fl. July, Aug., Sept.; pale greenish-white.

Also occurs in Southern India.

The ovary appears to be entirely inferior and the disk epigynous, and the plant should perhaps form a separate genus as proposed by Baillon.

Wood moderately heavy, rather soft, pale yellowish-brown, shining. Received from Pasdun Korale under the name 'Pub-bériya.' It is also called 'Liyan' in some parts, but that name properly belongs to *Blackwellia.*

4. **OPILIA,** *Roxb.*

Sub-scandent shrubs; fl. minute, in axillary spikes; cal. minute, annular, scarcely toothed; pet. 5, distinct; stam. 5, distinct, opp. pet.; staminodes 5, fleshy, alternate with pet.; ov. 1-celled, with solitary pendulous ovule; fruit a drupe, stone 1-seeded, embryo long, in axis of endosperm.—Sp. 2; 1 in *Fl. B. Ind.*

O. amentacea, *Roxb. Cor. Pl.* ii. 31 (1798).
Thw. Enum. 41. C. P. 2916.
Fl. B. Ind. i. 583. Wight, Ill. t. 40.

A weak, semi-scandent shrub, young branches finely pubescent; l. 2–3 in., lanceolate or ovate-lanceolate, acute at base, tapering to acute apex, often somewhat falcate, entire, glabrous, petiole very short; fl. on slender ped., arranged in little clusters of 2–4 in narrow, erect, shortly stalked, axillary spikes about 1 in. long, each cluster covered before expansion by a rotundate, acute, ciliate bract (these overlapping give the unexpanded infl. the appearance of a catkin); cal. a mere ring; pet. oblong; stam. a little shorter than pet., staminodes very fleshy, shorter than stam.; ov. narrowly oblong, style very short; drupe $\frac{5}{8}$ in., ovoid, blunt, puberulous, glaucous-green, stone very thin.

Dry country; rather rare. Pomparripu; Gonagama; Kalpe, E. Prov. Fl. April; yellow.

Also in Southern India, Burma, Malay Archipelago, and Trop. Africa and Australia.

5. **CANSJERA,*** *Juss.*

Climbing shrubs; fl. *monochlamydeous*, in spikes; perianth *gamophyllous*, urceolate, 4- (or 5-) lobed; stam. 4 (or 5), opp. per.-lobes, distinct, free; staminodes 4 (or 5), alternating with stam., small, fleshy; ov. 1-celled, with solitary erect ovule; fruit a drupe, stone 1-seeded; embryo with linear cotyledons, in fleshy endosperm.—Sp. 4; 2 in *Fl. B. Ind.*

This genus is probably more naturally placed in *Thymelæaceæ*, as is done in Thwaites' Enum. There is certainly no separate calyx present in our species.

C. Rheedii, *Gmel. Syst.* i. 280 (1790). **Éta-mura,** *S.*
C. scandens, Roxb., Moon Cat. 12. Thw. Enum. 251. C. P. 3930. Fl. B. Ind. i. 582 (not given for Ceylon). Wight, Ic. t. 1861.

A small climbing shrub, much and divaricately branched, the younger branchlets finely pubescent; l. $1\frac{1}{2}$–4 in., ovate or ovate-lanceolate, acute or slightly rounded at base, acuminate, obtuse, entire, glabrous, thick, petiole very short; fl. small, sessile, in small, pubescent, axillary spikes $\frac{1}{2}$–$\frac{3}{4}$ in. long; per. with minute, rough pubescence outside, lobes small, acute, recurved; stam. as long as tube of per., staminodes, very short, erect, ovate, acute; ov. conical, style a little longer than stam., stigma capitate, 4-lobed; drupe $\frac{3}{8}$–$\frac{1}{2}$ in., oblong-ovoid, blunt, apiculate, smooth, red, stone thin, brittle, crustaceous.

Low country in both dry and moist regions; common. Mannar, Koenig (Mus. Brit.). Fl. Jan., Feb.; pale yellow.

Also in India, Malaya, China, and Trop. Australia.

The leaves are finely wrinkled and greyish-yellow when dry.

Three women at Galle are said to have been poisoned by this plant, eaten accidentally with vegetables.

6. **LASIANTHERA,** *Beauv.*

Trees; fl. in axillary, pedunculate heads; cal. cup-shaped, 5-lobed; pet. 5, valvate; stam. 5, free and distinct, alt. with pet., fil. flat, with a thick tuft of long white hair at top; disk small, cup-shaped; ov. 1-celled, with 2 pendulous ovules, tapering to subulate style, stigma minute; fruit a drupe, stone woody, 1-celled, 1-seeded; seed with embryo in axis of copious fleshy endosperm, cotyledons leafy, ovate, cordate. —Sp. 5; 4 in *Fl. B. Ind.*

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* From Tsjerou-Cansjeram one of the Malabar names given by Rheede for this plant.

L. apicalis, *Thw. Enum.* 405 (1864). **Urukanu, Uruhonda,** *S.*
Urandra apicalis, Thw. in Kew J. Bot. vii. 211. *Stemonurus apicalis*, Thw. Enum. 43. C. P. 2569.
Fl. B. Ind. i. 584. Bedd. Fl. Sylv. t. 139.

A moderate-sized or large pyramidal tree, with a straight trunk and the lower branches somewhat drooping, bark nearly smooth, young parts glabrous, varnished; l. 5–8 in., lanceolate-oblong, acute at base, suddenly and shortly acuminate, entire, glabrous and shining, coriaceous, paler beneath, with a very prominent midrib, petiole $\frac{1}{2}$–$\frac{3}{4}$ in.; fl. $\frac{1}{4}$–$\frac{3}{8}$ in., sessile, 6–12 together in a head surrounded by 4 ovate, pubescent bracts, peduncle stout, usually shorter than petiole; cal. very slightly pubescent, lobes obtuse; pet. thrice as long as cal., oblong, flat; hairs on stam. exserted beyond pet., completely covering over and concealing the anth. on the outside; disk slightly 5-lobed; drupe 1$\frac{1}{2}$–1$\frac{3}{4}$ in., ovoid-oblong, subacute, supported on persistent cal., smooth, lower half purplish-green, upper half white, pulp very scanty, stone thick, woody, with large cavities filled with soft tissue, the outer part with vertical, fibrous, woody bands.

Moist low country up to 2000 ft.; rather rare. Pasdun Korale; Allagala. Fl. June; purplish-green.

Also in Borneo.

A very handsome pyramidal tree with laurel-like foliage; the young leaves are coppery-red.

I have also the S. names 'Uru-éta' and 'Kospana' for this from Pasdun Korale.

7. GOMPHANDRA, *Wall.*

Shrubs or small trees; fl. polygamo-diœcious, in small paniculate clusters; cal. minute, annular, 4- or 5-toothed; pet. 4 or 5, connate into a 4- or 5-lobed tubular corolla; stam. 4 or 5, distinct, free, alt. with pet., fil. fleshy, usually with a small tuft of gland-tipped hairs at the top on back; disk small, annular; ov. 1-celled, with 2 collateral pendulous ovules, style 0, stigma large, sessile, disciform; fruit a drupe, capped with persistent flat stigma, stone woody-crustaceous, 1-celled, 1-seeded; seed with minute embryo at apex of copious endosperm, which is divided into two halves longitudinally.—Sp. 6; all in *Fl. B. Ind.*

L. thin; infl. axillary . . . . 1. G. AXILLARIS.
L. coriaceous; infl. extra-axillary . . . . . 2. G. CORIACEA.

1. **G. axillaris,** *Wall. Cat.* n. 3718 (1828).
Stemonurus zeylanicus and *S. Heyneanus*, Miers, Contrib. i. 91 and 93. *Platea axillaris*, Thw. Enum. 44. C. P. 251.
Fl. B. Ind. i. 586. Wight, Ic. t. 954 (*G. polymorpha* ♀), Miers, Contrib. i. t. 14 f. 1 (*S. zeylanicus*).

A shrub or small slender tree, young parts puberulous; l. variable from broadly oval to narrowly oblong-lanceolate or slightly obovate, tapering at base, acuminate or caudate, obtuse, entire, glabrous, thin, veins rather prominent beneath, petiole about $\frac{1}{4}$ in.; fl. very small, 2–10, usually 3, in little, axillary, paniculate clusters, or solitary, peduncle $\frac{1}{4}$–$\frac{1}{2}$ in., puberulous, buds very blunt; corolla-lobes shallow; stam. exserted, hairs conspicuous; drupe $\frac{1}{2}$–$\frac{5}{8}$ in., oblong, blunt at both ends, smooth, white.

Moist region, up to 4000 ft.; common. Fl. May; pale green.
Also in Southern India and Silhet.

2. **G. coriacea,** *Wight, Ill.* 103 (1840).
Stemonurus Walkeri, Miers, l. c. 93. *Platea coriacea*, Thw. Enum. 44. C. P. 375.
Fl. B. Ind. i. 586 (*G. polymorpha*). Wight, Ic. t. 953 (*G. polymorpha* ♂). Miers, Contrib. i. t. 14, f. 2 (*S. Walkeri*).

A shrub; l. as in *G. axillaris* and equally variable but coriaceous, with rather longer petioles; fl. rather larger, more numerous, sessile, panicle larger, dichotomous, leaf-opposed or extra-axillary; corolla rather more deeply lobed; hairs on stam. much shorter or quite absent; drupe as in the last.

Montane zone up to 6000 ft.; rather common. Dimbula; Maturata; Ambagamuwa; Kellebokka; Rangala, &c. Fl. March, April; green.
Also in South Indian mountains.
A common and variable plant in wet forests in the hills, possibly only a montane var. of *G. axillaris*. Wight's *G. polymorpha* seems to have been made up of this and the last, and the name is better not maintained for either of them.

8. **APODYTES,** *E. Meyer.*

Trees; fl. bisexual, in terminal panicles; cal. minute, cup-shaped, 5-toothed; pet. 5, distinct, valvate; stam. 5, alt. with pet., distinct, fil. not bearded; ov. 1-celled, with 2 collateral pendulous ovules, style lateral, stigma small, capitate; fruit a drupe, small, compressed, very gibbous, stone 1-celled, 1-seeded; seed with small embryo in apex of fleshy endosperm.—Sp. 9; 4 in *Fl. B. Ind.*

A. Gardneriana, *Miers, in Ann. Mag. Nat. Hist., ser.* 2, ix. 389. (1852).
Thw. Enum. 42. C. P. 204.
Fl. B. Ind. i. 588. Miers, Contrib. t. 5 (poor).

A small or moderate-sized tree, with smooth grey bark, young parts puberulous; l. $2\frac{1}{2}$–$5\frac{1}{2}$ in., variable, from broadly oval to oblong-lanceolate or slightly obovate, tapering to base, rounded, obtuse or slightly acuminate at apex, entire, the margin usually strongly revolute, glabrous, more or less coriaceous, petiole $\frac{1}{2}$–$\frac{3}{4}$ in.; fl. small, on short ped., in small terminal, rarely axillary, lax panicles with divaricate branches, buds oval-oblong; pet. strap-shaped, apiculate, recurved; stam. spreading, anth. linear, versatile; ov. gibbous, pubescent, style as long as ov.; drupe $\frac{1}{4}$ in. long, $\frac{1}{2}$ in. wide, compressed, lop-sided, flat on one side and with a flat, shield-like appendage there, very gibbous on the other side, black, shining, style persistent, terminating the flat side.

Montane zone up to 6000 ft.; rather common. Nuwara Eliya; Hakgala; Uda Pusselawe; Maturata; Ambagamuwa; Madulkelle; Matale East; Rangala. Fl. all the year; white, sweet-scented.
Endemic.

This is very close to *A. Benthamiana*, Wight, of the Nilgiris (Wight, Ic. t. 1153), and if it prove the same must take that name. The plant turns black in drying.

9. **MAPPIA,** *Jacq.*

Small trees; fl. bisexual, in terminal cymes; cal. cup-shaped, 5-toothed; pet. 5, connate below, hairy within; stam. 5, alt. with pet., free; disk cup-shaped, lobed; ov. 1-celled, with 2 pendulous collateral ovules, style short, stigma capitate; fruit a drupe, stone hard, very thin, 1-seeded; embryo in axis of fleshy endosperm, cotyledons foliaceous, ovate.—Sp. about 8; 4 in *Fl. B. Ind.*

M. ovata, *Miers in Ann. Mag. Nat. Hist. ser.* 2, ix. 395 (1852).
Gandapana, *S.*
M. Gardneriana, Miers, Contrib. l. c. 66. *M. fœtida*, Thw. Enum. 43 (non Miers). C. P. 492.
Fl. B. Ind. i. 589. Miers, Contrib. i. t. 8.

A small tree, bark whitish, buds pubescent; l. 4–8 in., ovate or oblong-ovate, acute at both ends, usually shortly acuminate, entire, glabrous above, lat. veins oblique, 6–8 on each side, prominent beneath, usually with a tuft of hair in the axils or hairy throughout, petiole $\frac{1}{2}$–$1\frac{1}{2}$ in.; fl. $\frac{3}{8}$ in., on very short ped., in a stout, erect, pubescent, terminal, corymbose

cyme about 3 in. long, buds nearly globular; cal. pubescent; pet. lanceolate, acute, hairy on both sides; ov. flask-shaped, hairy; drupe $\frac{1}{2}$–$\frac{5}{8}$ in., oblong-ovoid, obtuse at both ends, minutely apiculate, smooth, purple.

Var. β. **Championiana,** *Miers*, l. c. (sp.).
Fl. B. Ind. i. 589 (*M. oblonga*, Miers).

L. larger, thinner in texture and with fewer lat. veins, buds ovoid.

Moist region from sea-level to 7000 ft. Fl. April; yellow.
Also in Southern India.
The true *M. fœtida*, Miers, confined to the Nilgiris, is figured in Bedd. Fl. Sylv. t. 141.
I cannot see more than one variable species in the Ceylon plants. Miers' *M. ovata* is based on Gardner, n. 99 (from Peradeniya), his *M. Gardneriana* on Gardner, n. 98 (from N. Eliya), which is the common montane form with smaller leaves. Var. β. is scarcely more worth distinction.
The flowers and, to a less extent, the leaves, have a strong fœtid odour, whence the native name.

10. PYRENACANTHA, *Hook.*

Climbing shrubs; fl. minute, unisexual, diœcious, *monochlamydeous;* perianth *gamophyllous*, deeply 4-fid; male fl.:—stam. 4, distinct, alt. with per.-lobes, ov. abortive; fem. fl.:—ov. 1-celled, with 2 collateral pendulous ovules, style none, stigma sessile, with many radiating branches; fruit a drupe, stone thin, provided on the inner surface with numerous, obtuse, horizontal spines penetrating the endosperm; seed solitary, embryo in centre of fleshy endosperm, cotyledons large, foliaceous.—Sp. 6.

P. volubilis, *Hook. Bot. Misc.* ii. 108 (1831).
Baill. in DC. Prod. xvii. 20. Thw. Enum. 290. C. P. 1024.
Omitted in Fl. B. Ind. Hook. Bot. Misc. ii. tt. Supp. 9 and 10.

A scandent shrub, with very slender stems and a milky juice, branches filiform, slightly rough, young parts pubescent; l. 3–5 in., narrowly lanceolate-oblong, tapering to narrow truncate base, which is provided with a small gland at each corner, tapering also to acute mucronate apex, somewhat undulate, entire or with shallow, distant, angular teeth each tipped with a gland, glabrous above, harsh with stiff adpressed hair beneath, petiole $\frac{3}{8}$–$\frac{1}{4}$ in., flexuose, glabrous; fl. minute sessile, male in lax, filiform, axillary spikes about 2 in., fem. about 8–10, in a little head on a filiform, axillary peduncle $\frac{1}{2}$–$\frac{3}{4}$ in.; per.-leaves acute, spreading in male, deflexed in fem.;

stam. shorter than per.; ov. hispid, with erect hairs; drupe ovoid, slightly compressed and keeled, obtuse, smooth, orange-red, stone thin, pitted externally; endosperm perforated with holes to accommodate the internal spines of the endocarp.

Dry country; very rare. Kurunegala; Puttalam. Fl. June; pinkish. Occurs also in Southern India.

This very singular genus has been omitted in the Flora of B. India, being found neither under *Olacineæ* nor *Santalaceæ*, to one of which Families it should be there referred.

XXXVI.—ILICINEÆ.

TREES; l. alternate, simple, without stip.; fl. regular, unisexual, diœcious, in axillary cymes or umbels; cal. deeply 4- or 5-fid, segments imbricate, persistent; pet. connate into a 4- or 5-lobed corolla; stam. 4 or 5, inserted on base of cor.; no disk; ov. 3–6-celled, with 1 pendulous ovule in each cell, style 0, stigma large, sessile; fruit a drupe, with 4–6 stones, each with 1 seed; embryo minute in fleshy endosperm.

Of our three species two are found in the higher montane zone and the other in the moist low country.

On account of the gamopetalous corolla this Order is sometimes placed along with the Corolliforæ.

ILEX, *L.*

For characters, see Order.—Sp. 145; 24 in *Fl. B. Ind.*

Leaves under 1 in. . . . . 1. I. WALKERI.
Leaves over 2 in.
  Leaves serrate; fl. 4-merous . . . . 2. I. DENTICULATA.
  Leaves entire; fl. 5-merous . . . . . 3. I. WIGHTIANA.

1. **I. Walkeri,** *Wight and Gardn. in Thw. Enum.* 184 (1860).
C. P. 298.
Fl. B. Ind. i. 600.

A small tree, much branched, bark grey, longitudinally furrowed, young parts glabrous; l. numerous, closely placed, persistent, very variable, usually ½–1 in., rotundate or oblong-oval or obovate or lanceolate, obtuse or retuse or apiculate or acute, entire or with few shallow serratures near tip, margin revolute, coriaceous, glabrous, petiole short, stout; fl. very

small, fem. in sessile, male in shortly stalked, umbellate fascicles much shorter than l., ped. slender, much longer than fl.; cal.-segm. acute, glabrous; cor. 5-lobed, lobes rounded; stam. 5, stigma lobed; drupe $\frac{1}{6}$ in., nearly globular, stones 5, coherent.

Upper montane zone to the highest elevations; rather common. Pedurutalagala; Totapella; World's End, Horton Plains; Adam's Peak; Uda-Pusselawe; Ambagamuwa. Fl. April, Oct.; white.

Also in the hills of S. India.

The leaves are sometimes larger ($1\frac{1}{2}$–$1\frac{3}{4}$), lanceolate, and slightly acuminate; this is var. *major*, Thw. MS.

2. **I. denticulata,** *Wall. Cat.* n. 4333 (1828).
Thw. Enum. 183. C. P. 573.
Fl. B. Ind. i. 600. Wight, Ill. t. 149. Bedd. Fl. Sylv. t. 142.

A large tree, bark grey, twigs angular, young parts minutely puberulous; l. 2–3 in., oval or oblong-oval, acute at base, acuminate, obtuse, sharply and irregularly serrate, entire below, coriaceous, glabrous, veiny beneath, petiole $\frac{1}{4}$ in.; fl. $\frac{3}{8}$ in., in sessile or shortly stalked umbellate clusters much shorter than l., ped. $\frac{1}{4}$ in., slender; cor. deeply 4-lobed, lobes oval, obtuse; stam. 4, shorter than cor.-lobes; drupe over $\frac{1}{4}$ in., ovoid-globose, smooth, scarlet, stones 4, trigonous, ribbed.

Upper montane zone; rare. Nuwara Eliya; Bopatalawa Plains. Fl. Jan. Feb.; greenish-white.

Also in the Southern Indian Hills.

Of our three species this alone at all resembles the English holly (*I. Aquifolium*).

3. **I. Wightiana,** *Wall. Cat.* n. 4332 (1828). **Andun-wenna,** *S.*
Thw. Enum. 183. C. P. 2656 (female), 3484 (male).
Fl. B. Ind. i. 603 (var. *zeylanica*). Wight, Ic. t. 1216.

A large tree, bark white, young shoots glabrous; l. $2\frac{1}{2}$–5 in., oval, tapering at base, shortly acuminate, acute, quite entire, glabrous, veined beneath, petiole $\frac{1}{4}$–$\frac{3}{8}$ in.; fl. $\frac{1}{4}$ in., numerous, in small umbels arranged in axillary, stalked, paniculate cymes 1–$1\frac{1}{2}$ in. long, ped. short, puberulous; cal.-lobes rounded, ciliate; cor. deeply 5-lobed, lobes ovate; stam. 5 (or less), shorter than cor.-lobes; drupe $\frac{1}{4}$ in., globose, strongly apiculate, stones 5 or 6, trigonous, furrowed on back.

Moist low country, to upper limit; rare. Ratnapura; Nillowe; Hantane. Fl. Sept.–March; white.

Also in Southern India.

The Ceylon plant differs from the Indian in having much larger and more distinctly veined leaves and a more compound inflor. with the umbellules stalked; it is, perhaps, a distinct species.

XXXVII.—CELASTRACEÆ.

SHRUBS, sometimes climbing, or trees; l. simple, opp. or alt., with or without stip.; fl. regular, bisexual (rarely polygamous), small; cal. more or less deeply 5- (rarely 4-) lobed, persistent, lobes or sep. imbricate; pet. 5 (rarely 4 or 6), imbricate (rarely contorted), slightly connate in *Microtropis;* disk usually large and conspicuous, often lobed; stam. 5 or 4 or 3 (rarely 2), inserted on or outside disk; ov. free or immersed in disk, 2–5-celled, with 2 or more erect (rarely 1 pendulous) ovules in each cell, style short, more or less 3- (or 2-) fid; fruit a 2–5-valved loculicidal capsule, 1–many seeded, or a 1-seeded drupe (in the *Hippocrateæ* a berry or of distinct carp.); seed with or without a fleshy aril, usually with copious endosperm, rarely without endosperm, cotyledons flat, usually foliaceous.

Stam. 5 or 4, fil. subulate.
  Leaves opposite.
    Fruit a capsule.
      Seeds not winged.
        Capsule 5-valved with several seeds.
          Pet. 5; ovules 2 in each cell . . 1. EUONYMUS.
          Pet. 4; ovule solitary in each cell . 2. GLYPTOPETALUM.
        Capsule 2-valved, 1-seeded . . . 3. MICROTROPIS.
      Seeds winged . . . . 4. KOKOONA.
    Fruit a drupe.
      Stam. inserted outside small disk . . 5. PLEUROSTYLIA.
      Stam. inserted on surface of large disk . 6. ELÆODENDRON.
  Leaves alternate.
    Climbing shrub . . . . 7. CELASTRUS.
    Shrubs; capsule 3-valved . . . . 8. GYMNOSPORIA.
    Tree; capsule 2-valved . . . . . . 9. KURRIMIA.
Stam. 3, fil. flattened (*Hippocrateæ*).
  Fruit of 1–3 two-valved carpels . . . . 10. HIPPOCRATEA.
  Fruit a fleshy berry . . . . 11. SALACIA.

Of our 19 species, 10 are found in the moist low country, and 2 of these, *Kokoona* and *Kurrimia*, extend upwards into the lower montane zone. Six are species of the dry region, of which one, *Elæodendron*, has also a montane variety. *Microtropis* and *Euonymus revolutus* are confined to the hills.

1. EUONYMUS, *L.*

Trees or shrubs; fl. in small axillary infl.; cal. deeply 5-fid, persistent; pet. 5, flat, rotundate, spreading; disk large, fleshy, 5-lobed; stam. 5, inserted on margin of disk; ov. sunk

in disk, 5-celled, with 2 superposed ovules in each cell, style very short; fruit a 5-celled, 5-valved, loculicidal capsule; seeds more or less covered with fleshy aril, embryo in axis of copious endosperm.—Sp. 40; 27 in *Fl. B. Ind.*

L. entire; inflor. pedunculate.
  Pedicels very short . . . . 1. E. REVOLUTUS.
  Pedicels $\frac{1}{2}$ in. or more . . . . 2. E. THWAITESII.
L. serrate-crenate; inflor. nearly sessile . . . 3. E. WALKERII.

1. **E. revolutus,** *Wight, Ill.* i. 178 (1840).
Thw. Enum. 73. C. P. 579.
Fl. B. Ind. i. 608.

A small or moderate-sized tree, young parts glabrous; l. often 3 at a node, $1\frac{1}{2}$–3 in., oval or rotundate, acute or rounded at base, obtuse, entire, margins usually strongly revolute, glabrous, coriaceous, petiole very short; fl. about $\frac{1}{2}$ in., shortly pedicellate, 1–3, on slender, axillary peduncles often in pairs $\frac{1}{2}$–$\frac{3}{4}$ in. long; cal.-segm. rotundate; capsule $\frac{1}{2}$–$\frac{3}{4}$ in., turbinate, flat-topped; seeds angular, smooth, brown.

Upper montane zone; rare. Nuwara Eliya; Adam's Peak; Horton Plains. Fl. Jan., Feb.; bright flesh-pink.
Endemic.
The fl. are very pretty.

2. **E. Thwaitesii,** *Laws. in Fl. B. Ind.* i. 608 (1875).
E. dichotomus, Thw. Enum. 73 (non Heyne). C. P. 171.
Fl. B. Ind. i. 608.

A small tree, twigs slender, glabrous; l. $1\frac{1}{2}$–$2\frac{1}{2}$ in., rhomboid-lanceolate, tapering to base, obtusely acuminate, margin not revolute, entire, glabrous; fl. $\frac{1}{4}$ in., ped. $\frac{1}{2}$ in., slender, jointed, in threes on slender axillary peduncle $\frac{1}{2}$–$\frac{3}{4}$ in. long; cal.-segm. very obtuse; capsule $\frac{1}{2}$ in., obovate-turbinate, glabrous; seeds as in *E. revolutus.*

Moist low country; very rare (?) Ambagamuwa; Galagama. Fl. May.
Endemic.

[*E. dichotomus*, Heyne, has been inadvertently given in Fl. B. Ind. for Ceylon, the locality quoted being that at Galagama, above given for *E. Thwaitesii.*]

3. **E. Walkerii,** *Wight, Ill.* i. 178 (1840).
E. zeylanicus, Moon Cat. 17. Thw. Enum. 73. C. P. 478.
Fl. B. Ind. i. 608.

A small tree, branches dichotomous, twigs somewhat quadrangular, glabrous; l. nearly sessile, $1\frac{3}{4}$–4 in., variable, oval or lanceolate or subovate or sub-rhomboid, acute at base, obtuse or acute or acuminate at apex, usually shallowly

crenate-serrate, entire at base, glabrous; fl. $\frac{1}{3}$ in., on very short ped., solitary or in threes, sessile in the axils, or on a very short peduncle; sep. very obtuse; capsule $\frac{3}{4}$ in., pyriform-turbinate; seeds with a very large aril, smooth, yellowish.

Moist low country to upper limit; common. Fl. Jan.–April; greenish-crimson.

Endemic.

Foliage varies considerably, but the inflor. is uniform. The inner bark is a brilliant dead orange-colour.

2. GLYPTOPETALUM, *Thw.*

Small trees; fl. in extra-axillary, paniculate cymes; cal. small, 4-lobed; pet. 4, oblong, with 2 deep pits on upper surface; disk large, tumid, quadrangular, tapering into style; stam. 4, inserted at angles of disk, connective very large, anth.-cells small, divergent at base; ov. immersed in disk, 4-celled, with 1 pendulous ovule in each cell, style very short, stigma minute; fruit a loculicidal, 1–4-celled and -seeded capsule; seed nearly covered by aril, embryo large, in axis of endosperm, cotyledons flat, leafy.—Sp. 6; 3 in *Fl. B. Ind.*

G. zeylanicum, *Thw. in Kew Journ. Bot.* viii. 263 (1856).
Thw. Enum. 73. C. P. 589.
Fl. B. Ind. i. 612. Kew Journ. Bot. viii. t. 7 B. Bedd. Fl. Sylv. t. anal. 9 f. 5.

A small tree, young parts glabrous; l. 3–6 in., oval or lanceolate, tapering at both ends, usually acuminate, acute, sharply and shallowly serrate or nearly entire, glabrous, petiole $\frac{1}{4}$ in.; fl. $\frac{1}{2}$–$\frac{3}{5}$ in., arranged in smooth, stalked, dichotomously paniculate, extra-axillary cymes shorter than l., ped. over $\frac{1}{4}$ in.; pet. very obtuse or truncate, fleshy, reflexed; disk very conspicuous; capsule 1–4-lobed, depressed, green, smooth; seed $\frac{3}{4}$ in., ovoid, aril crimson.

Moist low country to its upper limit; rather common. Pasdun Korale; Morowak Korale; Kaduganawa; Ambagamuwa; Hantane; Uva. Fl. Feb.; pale green.

Also in Annamally Hills, S. India.

3. MICROTROPIS, *Wall.*

Shrubs or trees; fl. sessile, in small clusters; sep. 5, rounded, strongly imbricate; pet. 5, often slightly connate at base; disk annular, slightly lobed; stam. 5, inserted on upper edge of disk; ov. 2-celled, with 2 collateral ovules in each

cell, style short, stigma faintly 4-lobed; fruit a tardily 2-valved capsule, 1-celled, 1-seeded; seed erect, without an aril, embryo straight in axis of copious endosperm, cotyledons foliaceous.—Sp. 98; in *Fl. B. Ind.*

L. acute or tapering at base . . . . . 1. M. WALLICHIANA.
L. rounded or subcordate at base . . . 2. M. RAMIFLORA.

1. **M. Wallichiana,** *Wight, in Thw. Enum.* 71 (1858).
C. P. 43.
Fl. B. Ind. i. 613.

A small or moderate-sized tree, young parts glabrous; l. $2\frac{1}{2}$–6 in., shortly petiolate, oval or lanceolate, acute or tapering at base, obtuse, usually acuminate, glabrous, entire; fl. very small, about $\frac{1}{12}$ in., sessile or very nearly so, in small, dense, axillary or extra-axillary fascicles; pet. broadly oval, somewhat narrowed at base; capsule $\frac{1}{2}$–$\frac{5}{8}$ in., fusiform-oblong, narrowed to base, acute, apiculate, striate.

Lower montane zone; rather common. Kellebokka; Hunasgiria; Hantane; Deltota; Galagama; Adam's Peak; Haputale. Fl. Feb., March; white.

Endemic.

The Haputale specimens have the fruit shorter, only $\frac{1}{4}$–$\frac{3}{8}$ in. long.

2. **M. ramiflora,** *Wight, Ic.* iii. 3, 7 (1845).
Thw. Enum. 72. C. P. 148.
Fl. B. Ind. i. 613. Wight, Ic. t. 977.

A much-branched shrub or small tree, twigs somewhat angular, glabrous; l. 1–$2\frac{1}{2}$ in., variable, rotundate or broadly or narrowly oval, rounded or subcordate at base, usually very obtuse, entire, glabrous, very coriaceous, the margin often very strongly revolute, petiole short, thick; fl. about $\frac{1}{8}$ in., sessile, in small, dense, sessile or shortly pedunculate, axillary or extra-axillary clusters; capsule $\frac{1}{2}$ in., ovoid, tapering to apex, apiculate, scurfy.

Upper montane zone; rather common. Nuwara Eliya; Horton Plains; Totapella; Maturata; Adam's Peak; Rangala. Fl. Nov.–Feb.; white.

Also in the Nilgiri Mts. of S. India, but Wight's figure above quoted is not very good for our plant.

Varies a great deal in the leaves; in the Adam's Peak plant they are remarkably cucullate.

4. KOKOONA,* *Thw.*

Large trees; l. opp., with minute stip.; fl. in axillary panicles; cal. cup-shaped, shallowly 5-lobed; pet. 5, contorted

* From the Sinhalese name.

in bud; disk large, perigynous, annular, lobed; stam. 5, inserted on top of disk; ov. 3-celled, with 2 pairs of ascending ovules in each cell, style short, stigma capitate, slightly 3-lobed; fruit a 3-celled, 3-valved, loculicidal capsule, with 4 seeds in each cell; seeds with a large wing, cotyledons flat, oval, no endosperm.—Sp. 3; 2 in *Fl. B. Ind.*

K. zeylanica, *Thw. in Kew Journ. Bot.* v. 380 (1853). **Kokun, Wana-potu,** *S.*
Thw. Enum. 52. C. P. 2584.
Fl. B. Ind. i. 616. Kew J. Bot. v. t. 6. Bedd. Fl. Sylv. t. 146.

A very large tree, much branched, bark rough, corky, grey, bright yellow within, young parts glabrous; l. $2\frac{1}{2}$–4 in., obovate, cuneate at base, rounded or retuse at apex, entire or faintly serrate, coriaceous, glabrous, paler beneath and there punctate with numerous, minute, glandular dots each covered by a red scale, petiole about $\frac{1}{2}$ in., stip. very minute, triangular, persistent; fl. $\frac{1}{2}$ in., in axillary or extra-axillary panicles much shorter than l., ped. glabrous, bracts minute; cal. glabrous, lobes very shallow; pet. rounded, concave, thick, dotted within; stam. shorter than pet.; disk fleshy, dark green; capsule nearly 4 in., oblong-ovoid, bluntly trigonous, valves thick, coriaceous, glabrous; seed compressed, over 3 in. long (with the wing), wing broadly oblong, straight on one side, obtuse, veined, orange-yellow.

Forests in moist region, between 1000–4000 ft.; rather rare. Pelawata, Pasdun Korale; Ratnapura; Porey (Ferguson); Ambagamuwa; Dimbula; Sabaragamuwa (Moon); Udugama and Hiniduma Forests (Capt. Walker). Fl. March–May; dull yellowish-brown.

Also in the Annamally Hills, S. India.

Moon's specimen is a young branch with leaves only, he appears to have referred it to '*Swietenia febrifuga*' (see under *Soymida*).

Wood pale yellowish-brown, smooth, light, readily splitting. The inner bark is of a brilliant yellow colour, and is used by jewellers for polishing gold embroidery, and also as a snuff when powdered.

5. **PLEUROSTYLIA,** *Wight.*

A tree; l. opp., with very minute stip.; fl. in axillary cymes; cal. cup-shaped, shallowly 5-lobed; pet. 5; disk perigynous, small, annular, lobed; stam. inserted outside disk; ov. 2- (or 1-) celled, with 2 collateral ovules in each cell, style very short, stigma large, capitate; fruit a small drupe, endocarp thin, crustaceo-fibrous; seed solitary, erect, cotyledons flat, rotundate, in axis of copious endosperm.—Monotypic.

P. Wightii, *W. and A. Prod.* 157 (1834). **Piyari, Panaka,** *S.* **Chiru-piyari,** *T.*

Thw. Enum. 71. C. P. 329.
Fl. B. Ind. i. 617. Wight, Ic. t. 155.

A moderate-sized, much-branched tree, bark rough, pale, young parts glabrous; l. 2–3 in., lanceolate-oblong or oval, tapering to very short petiole, obtuse or rounded or emarginate, entire, glabrous, rather thick, shining, stip. very minute, deciduous; fl. very small, in small, axillary, shortly stalked, paniculate cymes, ped. short, divaricate; cal. glabrous, lobes very obtuse; pet. rotundate, spreading or reflexed; stam. shorter than pet.; drupe $\frac{3}{8}$ in., ovoid, supported on persistent cal., smooth, marked half way down one side with scar of style, pure white, endocarp thin.

Dry country; common. A specimen (Gardner, 172) is labelled by him 'Kalutara,' but this must be an error, unless cultivated there in the old Botanic Garden. Fl. Sept., Oct.; pale green.

Also in S. India, Mauritius, and Madagascar.

Wood pale brown, close-grained, smooth, rather heavy. The pure white berries are precisely like birds' eggs in miniature; the embryo is green.

6. **ELÆODENDRON,** *Jacq. f.*

Trees; l. opp., with minute stip.; fl. in dichotomous, spreading cymes; cal. deeply 5-fid, imbricate; pet. 5, imbricate; disk large, tumid; stam. 5, inserted on disk; ov. immersed in disk, 2-celled, with 2 collateral erect ovules in each cell, style conical, very short; fruit a drupe, stone 1-celled, 1-seeded; seed without an aril, embryo in copious endosperm.—Sp. 30; 1 in *Fl. B. Ind.*

E. glaucum, *Pers. Syn.* i. 241 (1805). **Neralu,** *S.* **Piyari, Perun-piyari,** *T.*

Schrebera albens, Retz. Obs. vi. 25. *Celastrus glaucus*, Vahl, Symb. Bot. ii. 42. Moon Cat. 17. Thw. Enum. 73. C. P. 1227.
Fl. B. Ind. i. 623. Wight, Ill. t. 71 (*E. Roxburghii*). Retz. Obs. vi. t. 3.

A small tree, much dichotomously branched, bark worted, thick, brownish-grey, twigs slender, young parts glabrous; l. opp., 2–3 in., variable, oval or roundish-oval, acute at base, obtuse, often twisted at apex, shallowly serrate-crenate or entire, glabrous, rather coriaceous, glaucous, reticulate, petiole $\frac{1}{4}$ in. or more, stip. minute, triangular; fl. under $\frac{1}{8}$ in., numerous, in very divaricate, axillary or extra-axillary, paniculate, dichotomous cymes, ped. long, glabrous; sep. almost distinct, rounded; pet. oblong, obtuse, distant; stam. much shorter

than pet., anth. roundish; disk obscurely lobed; drupe ovoid, $\frac{1}{3}$–$\frac{1}{2}$ in., apiculate, glabrous, stone bony.

Var. β. **montanum,** *Thw. Enum.* 73. C. P. 2520.

L. less glaucous; fl. much larger, $\frac{1}{2}$ in.; fr. larger, $\frac{3}{4}$ in.

Dry country; common, especially near the coast. Var. β. lower montane zone, from 3000 to 4500 ft.; rather common. Dimbula; Deltota; Hunasgiria. Fl. all the year; pale yellowish-green.

Also in India and Malay Archipelago.

Wood hard, heavy, close-grained, smooth, reddish-brown.

First noticed by Koenig, whose specimens are in Mus. Brit. Moon gives the name 'Bat-hik' for this.

The leaves vary extremely; in the dry region they are frequently found strongly serrate, and this form is called 'Karukku-vaychchi' by the Tamils. It is this which Roxburgh records (Hort. Beng. 18) as 'Ceylon Tea,' under which name it was sent from Ceylon to the Bot. Garden, Calcutta, by Gen. McDowall (see Roxb. Fl. Ind. i. 639).

7. CELASTRUS, *L.*

Climbing shrubs; l. alternate without stip.; fl. polygamous, in terminal panicles; cal. 5-lobed; pet. 5; disk annular; stam. 5, inserted on edge of disk; ov. 3-celled, with 2 erect ovules in each cell, style short, stigma deeply 3-lobed; fruit a loculicidal, 3-valved capsule, with 1–6 seeds; seed completely enveloped in aril, embryo in axis of copious endosperm, cotyledons flat, oval.—Sp. 15; 4 in *Fl. B. Ind.*

C. paniculatus, *Willd. Sp. Pl.* i. 1125 (1797). **Duhudu,** *S.*
Thw. Enum. 72. C. P. 1232.
Fl. B. Ind. i. 617. Wight, Ill. i. t. 72.

A large climbing shrub, bark rough, furrowed, young parts glabrous; l. alternate, 2–3$\frac{1}{2}$ in., broadly oval, acute at base, shortly acuminate, obtuse, shallowly crenate-serrate except at base, glabrous, petiole $\frac{1}{4}$–$\frac{3}{8}$ in.; fl. $\frac{1}{3}$ in., in terminal, pyramidal panicles 2–4 in. long, ped. slender, puberulous; cal.-lobes shallow, unequal; pet. oblong, broad-based, acute; disk inconspicuous; capsule $\frac{1}{2}$ in., broadly ovoid or roundish, blunt, transversely wrinkled, bright yellow, valves septifragal above, remaining united at base and spreading or reflexed, leaving the seeds exposed; seed $\frac{1}{3}$ in., cinnamon-brown, striate, completely enveloped in scarlet fleshy aril.

Moist low country to 2000 ft.; common. Fl. May; pale yellow.

Throughout India, Malaya, and the Philippines.

The ripe fruit is a very pretty object: the seed is very often solitary, and the fruit thus 1-celled. The bark and an oil from the seeds are used medicinally.

8. **GYMNOSPORIA,** *W. & A.*

Shrubs; l. alternate, without stip.; fl. in crowded cymes; cal. shallowly 5-lobed; pet. 5; stam. 5, inserted outside and beneath disk; disk large, tumid, not lobed; ov. fused with disk, 2–3-celled, with 2 ovules in each cell, style short, stigmas 3; fruit a 3-valved, 3-celled, loculicidal capsule, with 1 or 2 seeds in each cell; seed with a small basal aril, embryo straight in axis of endosperm, cotyledons flat, broadly oval.—Sp. 60; 16 in *Fl. B. Ind.*

Lateral branchlets not spinous; l. crenate-serrate . 1. G. FRUTICOSA.
Lateral branchlets spinous; l. entire . . . 2. G. EMARGINATA.

1. **G. fruticosa,** *Hk. f. in Thw. Enum.* 409 (1864).
Catha fruticosa, Thw. Enum. 72. C. P. 3386.
Fl. B. Ind. i. 619.

A shrub, 8–10 ft., twigs angular, not spinous, young parts glabrous; l. 1–1½ in., spathulate-oblong, tapering to short petiole, obtuse or retuse, finely crenate-serrate except at base, thick, glabrous, reticulate beneath; fl. ¼ in., in corymbose cymes shorter than the l., ped. very slender; pet. ovate, obtuse; stam. very short; stigmas recurved; capsule small, ¼ in., roundish-obovoid, apiculate, transversely striate, crimson; seed globular, shining, scarlet, partially covered by the small white aril.

Upper zone of moist low country; very rare. Only found on the banks of the Mahaweli, near Navalapitiya, in 1855. Fl. Oct.; yellowish-white.

Endemic.

2. **G. emarginata,** *Hk. f. in Thw. Enum.* 409 (1864).
Fl. Zeyl. n. 437 (*Euonymoides*). *Catha emarginata*, G. Don, Thw. Enum. 72. C. P. 1235.
Fl. B. Ind. i. 621.

A shrub, with numerous long, rigid, divaricate, zigzag branches, set with short, straight, lateral, horizontal twigs spinous at the point; l. scattered on the branches, usually fasciculate on the spinous twigs, 1–2½ in., usually oblong-spathulate but varying from narrow-lanceolate to rotundate, very obtuse or retuse, entire, very coriaceous, glabrous, shining above, paler beneath; fl. ⅜ in., in dense, sessile or very shortly stalked, cymose clusters on the spinous twigs or immediately above them, ped. long, very slender, glabrous; cal.-lobes very obtuse, thin, ciliate; pet. triangular-lanceolate, subacute, often reflexed; disk very broad and tumid; stam. nearly as long as

pet., erect; capsule about $\frac{1}{4}$ in., turbinate, flat-topped, strongly trigonous, apiculate, finely transversely wrinkled.

Dry region; rather rare (?). Jaffna; Batticaloa; Lunugala, Uva. Fl. Oct.; pale greenish-yellow, sweet-scented.

Also in Southern India.

9. **KURRIMIA,** *Wall.*

Trees; l. alternate, stipulate; fl. sessile, in terminal panicles; cal. deeply 5-lobed, imbricate; pet. 5, imbricate; stam. 5, inserted on the disk; disk small, cup-shaped, with 5 lobes alternate with stam.; ov. 2-celled, with 2 erect collateral ovules in each cell, styles 2, filiform; fruit a leathery capsule, tardily 2-valved, 1–3-seeded; seed nearly covered by fleshy aril, embryo straight, green, in centre of fleshy endosperm, cotyledons narrow, oblong.—Sp. 5; all in *Fl. B. Ind.*

K. zeylanica, *Arn. in Nov. Act. Nat. Cur.* xviii. 328 (1836).
Palen, Ét-heraliya, Uru-honda, *S.* **Konnai,** *T.*
Thw. Enum. 72. C. P. 1225, 409.
Fl. B. Ind. i. 622. Bedd. Fl. Sylv. t. 147.

A large tree, young parts glabrous, bark smooth, rather thick, dark grey, buds pointed, enveloped in loose stip.; l. 4–6 in., oval or ovate-lanceolate, rounded at base, acute, often twisted at apex, entire, glabrous, lat. veins conspicuous, 12–15 on each side, parallel, curved, petiole about 1 in., thickened at top, stip. large, convolute, quickly deciduous; fl. $\frac{1}{3}$ in., sessile, laxly arranged on the branches of a glabrous, terminal panicle exceeding the l.; cal.-lobes oval, acute; pet. rounded, concave, longer than sep.; anth.-cells distant at base; ov. globular, with a dense tuft of hair on top; capsule $\frac{3}{4}$–$1\frac{1}{4}$ in., irregularly ovoid, blunt, glabrous, red; seeds erect, oblong-ovoid, brownish, aril thick, greenish-white, covering all but summit of seed, lacerate at top.

Moist region chiefly in the low country, but extending to 5000 ft.; rather common. Colombo; Kalutara; Singhe Raja Forest; Galagama; Hantane; Ambagamuwa; Maturata; Rangala; Sabaragamuwa. Fl. Feb., March, and (in hills) September; green.

Endemic.

Wood pale yellowish-brown, heavy, close-grained. The leaves are very like those of a Dipterocarp. The aril is slightly acidulous and edible.

C. P. 409 is a mountain form, var. *montana*, Thw., with larger flowers and shorter panicles.

10. HIPPOCRATEA, *L.*

Trees or climbing shrubs; l. opposite; fl. in paniculate cymes; cal. 5-lobed; pet. 5 (rarely 6); disk cup-shaped, closely surrounding ov.; stam. 3, inserted on or combined with disk, fil. flat, recurved; ov. 3-celled, with 2–6 ovules in each cell, style simple, short; fruit of 1–3 distinct carp., each 2-valved, with 2 or more seeds; seed with a long terminal wing, no endosperm.—Sp. 60; 8 in *Fl. B. Ind.*

Fl. $\frac{1}{3}$ in. diam.
  Pet. acute with a broad base . . . . . 1. H. OBTUSIFOLIA.
  Pet. rounded with a narrow claw . . . . 2. H. ARNOTTIANA.
Fl. minute . . . . 3. H. INDICA.

1. **H. obtusifolia,** *Roxb. Fl. Ind.* i. 166 (1832). **Diya-kirindi-wel,** *S.*
H. viridiflora, Moon Cat. 5. Thw. Enum. 52. C. P. 3158.
Fl. B. Ind. i. 623 (not given for Ceylon). Wight, Ic. t. 963.

A climbing shrub, young branches divaricate, somewhat quadrangular, young parts glabrous; l. 3–6 in., lanceolate, acute at base, shortly acuminate, obtuse, entire or very faintly crenate, glabrous, coriaceous, reticulate beneath, petiole very short; fl. $\frac{1}{3}$ in., in axillary, dichotomous, paniculate cymes usually shorter than l., ped. stout, puberulous; cal.-segm. triangular, reflexed; pet. narrowly triangular, very acute, hairy within, spreading; disk pubescent; ripe carp. not seen.

Moist low country; very rare. Kalutara; Peradeniya. Fl. Nov.; green.
Also in most parts of Tropical Asia, Australia, and Africa.

2. **H. Arnottiana,** *Wight, Ill.* i. 133 (1838).
Salacia terminalis, Thw. Enum. 407. C. P. 3737.
Fl. B. Ind. i. 624. Wight, Ill. tt. 46, 47A.

A tree, about 30 ft., very much branched, young parts glabrous; l. 3–4 in., oval, very shortly acuminate, obtuse, very shallowly serrate in upper part, glabrous, coriaceous, petiole under $\frac{1}{2}$ in.; fl. $\frac{1}{3}$ in., numerous, in large, spreading, lax, divaricate, paniculate cymes, terminal and from upper axils and much exceeding the l., ped. glabrous; cal. glabrous, lobes rounded; pet. rotundate, clawed, spreading or reflexed; disk very tumid; ripe carp. not seen (in Wight, Ill., $2\frac{1}{2}$ in., oblong, emarginate at top, with several seeds).

Moist low country; very rare. Galle district (Thwaites). Fl. October; yellow.
Also in Southern India.
I have not met with this. Wight (in Malabar) describes it as a climbing shrub, Thwaites as a tree.

3. **H. indica,** *Willd. Sp. Pl.* i. 193 (1797).
Herm. Mus. 13. Fl. Zeyl. n. 439 (Waelmedija). Moon Cat. 5. Thw. Enum. 52. C. P. 1164.
Fl. B. Ind. i. 625. Roxb. Cor. ii. t. 130 (bad).

A shrub, widely climbing by its divaricate branches, young parts glabrous; l. 1½–3 in., oval, tapering to base, shortly acuminate, obtuse, finely serrate in upper part, glabrous, thin, petiole about ½ in.; fl. minute, nearly sessile, in large terminal, branched, elongated panicles (made up of axillary cymes, the subtending l. being usually undeveloped); cal.-lobes oval, obtuse; pet. oblong, obtuse, spreading; ripe carp. 1–3, 1½–1¾ in., linear-oblong, much compressed, striate; seeds 2, wing emarginate, with a central vein.

Dry region; common. Fl. July, Dec.; pale yellow.
Also in India, Malaya, and Trop. Asia.
Hermann's native name is equivalent to 'Wel-mendiya;' I doubt if this is applied to the present species now.

11. SALACIA, *L.*

Climbing shrubs; l. opposite; fl. in clusters (rarely solitary), on axillary tubercles; cal. 5-lobed, imbricate; pet. 5 (or 4), imbricate; disk large, fleshy, closely investing ov.; stam. 3 (or 2), inserted on outer face of or combined with disk; ov. 3- (or 2-) celled, with 2 or more ovules in each cell, style short, simple; fruit an indehiscent berry, scarlet, with 1–8 seeds immersed in pulp; seeds large, without a wing, no endosperm.—Sp. 70; 20 in *Fl. B. Ind.*

Fruit under ½ in. long . . . . 1. S. PRINOIDES.
Fruit over ¾ in. long.
  Fl. shortly pedicellate; pet. oblong, spreading . 2. S. RETICULATA.
  Fl. sessile; pet. oval, erect . . . . . . 3. S. OBLONGA.

1. **S. prinoides,** *DC. Prod.* i. 571 (1824). **Hin-himbutu-wel,** S.
Thw. Enum. 53. C. P. 1165.
Fl. B. Ind. i. 626. Wight, Ic. t. 321.

A large climbing shrub, with divaricate branches, young twigs angular, glabrous; l. 2–3½ in., oval or lanceolate, acute at base, shortly acuminate, sub-obtuse, shallowly crenate-serrate, glabrous, rather coriaceous, petiole ¼ in.; fl. ¼–⅜ in., solitary or 2, from the axils of past or present l., ped. ¼–⅜ in., divaricate, smooth; cal. shallowly lobed, pubescent, persistent; pet. ovate-spathulate, clawed, rounded at apex, spreading; disk cup-shaped, enclosing ov.; fr. under ½ in., ovoid or slightly pyriform, blunt, minutely apiculate, supported on the disk

and the somewhat enlarged, reflexed, persistent cal., smooth, bright scarlet, 1-seeded.

Low country, chiefly in dry region; rather rare. Kalutara (?); Mannar Dist.; Jaffna. Fl. Dec.; greenish-yellow.
Also in India, Malaya, and the Philippines.

2. **S. reticulata,** *Wight, Ill.* i. 134 (1838). **Himbutu-wel, Kottala-himbutu,** *S.*
Thw. Enum. 53. C. P. 658.
Fl. B. Ind. i. 627.

A large woody climber, much dichotomously branched, bark pale yellow, young parts glabrous; l. $2\frac{1}{2}$–$4\frac{1}{2}$ in., oval, narrowed at base, usually shortly acuminate, obtuse, very shallowly crenate-serrate, glabrous and shining, paler and with prominent reticulate veins beneath, sub-coriaceous, petiole $\frac{1}{4}$ in.; fl. $\frac{1}{4}$ in., on short glabrous ped., 2–10 together on woody axillary tubercles; cal. scarcely lobed, glabrous; pet. oblong, obtuse, spreading; fr. $\frac{3}{4}$–$1\frac{1}{2}$ in., globular, smooth, bright pinkish-orange, pericarp soft-leathery, with 1–4 seeds immersed in pulp; seed 1 in., almond-like, testa membranous, yellowish, embryo homogeneous.

Var. β. **diandra,** *Thw. Enum.* 53 (sp.). C. P. 2720.

L. rather narrower, more acuminate, entire, reticulation finer; fl. usually solitary; pet. 4; stam. 2; ov. 2-celled.

Moist low country up to 3000 ft.; rather common. Bentota; Hantane; Hunasgiria. Var. β. Eknaligoda, Sabaragamuwa (Thw.). Fl. March, April; greenish-yellow.
Also in S. India; var. β. endemic.
I have little material for var. β., which is probably a distinct species.
The pulp of the fruit is eaten, and a decoction of the root is given in diabetes.

3. **S. oblonga,** *Wall. Cat.* n. 4226 (1828). **Chundan,** *T.*
C. P. 1061.
Fl. B. Ind. i. 628. Wight, Ic. t. 97; Ill. t. 47 B.

A climbing shrub, smaller branches densely sprinkled with lenticels, young parts glabrous; l. numerous, $2\frac{1}{2}$–4 in., oblong-lanceolate, tapering to base, obtuse, more or less strongly crenate-serrate, glabrous, sub-coriaceous, venation beneath prominent, reticulate, petiole $\frac{1}{4}$ in., rugose; fl. usually 3 together, sessile, with or without a very short common peduncle; cal. glabrous, deeply divided, lobes rounded; pet. oval, obtuse, erect; fr. $\frac{3}{4}$–$1\frac{1}{4}$ in., globular or somewhat pyriform, supported on enlarged persistent cal. and pet., faintly muriculate, bright

orange-red, with 1–8 seeds immersed in pulp; seeds somewhat angular.

Dry region; rather common. Trincomalie; Haragama; Atakalan Korale; Uma-oya. Fl. April; yellow.
Also in Southern India.

XXXVIII.—RHAMNACEÆ.

SHRUBS or small trees, often climbing; l. alt. or more rarely opp., with small stip.; fl. small, regular, bisexual, rarely polygamous; cal. 5-fid, lobes valvate, usually keeled within; pet. 5, usually very small and involute, or 0; stam. 5 (rarely 4), opp. the pet. and often slightly adnate to their base, inserted at the mouth of cal.-tube outside disk; disk fleshy, lining or filling the cal.-tube, the margin often free; ov. free or more or less immersed in disk (in *Gouania* quite inferior), 2–4-celled, with 1 erect ovule in each cell, style usually 2–4-fid; fruit usually indehiscent, fleshy or dry, or a 3-valved capsule of 3 separable carp.; seed with large embryo usually immersed in scanty, fleshy endosperm.

Fr. dry, indehiscent, 1-celled; ov. half-inferior . .	1. VENTILAGO.
Fr. a fleshy drupe, stone 1-4-celled; ov. half-inferior .	2. ZIZYPHUS.
Fr. a berry with 2–4 pyrenes; ov. superior.	
Pyrenes 3 or 4	3. RHAMNUS.
Pyrenes 2.	
Fl. pedicellate in axillary umbels	4. SCUTIA.
Fl. sessile in long spicate pannicles . . .	5. SAGERETIA.
Fr. a 3-valved capsule; ov. half-inferior . . .	6. COLUBRINA.
Fr. of 3 separable winged carpels; ov. quite inferior .	7. GOUANIA.

Of our 12 species, 9 are low country plants, 5 being confined to the dry region and 2 to the moist. *Sageretia* and both species of *Rhamnus* are mountain species.

1. VENTILAGO, *Gaertn.*

Woody climbers; l. alternate, with stip.; fl. in large terminal panicles; cal. with an obconical tube, 5-fid; pet. 5, small; stam. 5, slightly adnate to base of pet.; disk broad, flat, slightly 5-lobed; ov. half-inferior, 2-celled, styles 2; fruit

quite superior, dry, indehiscent, 1-celled, 1-seeded, with a long terminal wing; seed globose, embryo large, no endosperm.—Sp. 10; 5 in *Fl. B. Ind.*

V. maderaspatana, *Gaertn. Fruct.* i. 223 (1788). **Yaccada-wel,** *S.* **Vempadam,** *T.*
Moon Cat. 17. Thw. Enum. 74. C. P. 1236.
Fl. B. Ind. i. 631. Wight, Ic. t. 163.

A large, much-branched, woody climber, branchlets elongated, slender, young parts pubescent; l. $1\frac{1}{2}$–5 (usually about $2\frac{1}{2}$) in., ovate or ovate-lanceolate, obtuse or rounded at base, acuminate, obtuse or rarely acute, shallowly crenate-serrate or entire, glabrous and shining, lat. veins 6–10 on each side, fine but conspicuous, oblique, connected by very fine transverse reticulation, petiole $\frac{1}{8}$–$\frac{1}{4}$ in., stip. very small, lanceolate, pubescent; fl. $\frac{1}{6}$ in., numerous, on short pubescent ped., arranged in clusters on the branches of large, spreading and drooping, pubescent, elongated, terminal panicles; cal. pubescent, lobes erect, very acute; pet. shorter than cal., 2-lobed; stam. as long as pet., styles short; nut small, globular, supported on persistent cal., wing 1–$1\frac{1}{2}$ in., linear-oblong, leathery pubescent, veined, slightly bifid at apex.

Low country, in dry region very common; in moist region rather rare, *e.g.*, Heneratgoda; Pasdun Korale; Mirigama. Fl. June, July; pale green.

A very large climber, reaching the summit of the highest trees and hanging down in great masses. Said to be a favourite food of the elephant.

Moon gives 'Kola-wakka' as the S. name of this, and 'Patabambara' is used in the W. Prov. I have also had 'Wam-bodiya-wel' given me for it.

Vempadam bark is used for tanning, and is an article of export on a small scale from Trincomalie.

2. ZIZYPHUS, *Juss.*

Shrubs or small trees, usually semi-scandent by hooked prickles (transformed stip.); l. alternate, 3-veined; fl. in axillary clusters or paniculate cymes; cal. with an obconical tube, 5-lobed; pet. 5, small, reflexed, or 0; stam. 5, slightly adnate to base of pet.; disk flat, 5- or 10-lobed, with a free margin; ov. $\frac{1}{2}$-inferior, 2–4-celled; styles 2–4, distinct, or more or less connate; fruit a drupe, supported on adherent flattened cal.-tube, stone usually bony, 1–4-celled, 1–4-seeded; embryo large, no endosperm.—Sp. 50; 18 in *Fl. B. Ind.*

Pet. 5.
  Styles connate half-way up.
    L. rotundate, densely tomentose beneath . . 1. Z. JUJUBA.
    L. lanceolate or oval.
      L. silky beneath . . . . 2. Z. ŒNOPLIA.
      L. glabrous on both sides . . . . . . 3. Z. NAPECA.
  Styles distinct, 3 . . . . 4. Z. XYLOPYRA.
Pet. 0 . . . . 5. Z. RUGOSA.

1. **Z. Jujuba,** *Lam. Dict.* iii. 318 (1789). **Maha-debara,** *S.* **Ilantai,** *T.*

Herm. Mus. 12. Fl. Zeyl. n. 89. *Rhamnus Jujuba*, L. Sp. 194. Moon Cat. 17. Thw. Enum. 74. C. P. 1242.

Fl. B. Ind. i. 632. Wight, Ic. t. 99. Bedd. Fl. Sylv. t. 149.

A small, much-branched tree or a large shrub, bark dark grey, with deep, longitudinal fissures, branchlets elongated, flexuose, woolly-pubescent; l. 1–1½ in., broadly oblong-oval or rotundate, rounded at both ends, faintly and irregularly denticula e, glabrous above, densely covered beneath with whitish or Luff-coloured tomentum, petiole short, woolly, prickles short, very sharp, one usually curved, the other straight, often absent; fl. on hairy ped., in small axillary clusters or very shortly pedunculate, paniculate cymes; cal. woolly outside, segm. very acute; pet. very small, spathulate, recurved; disk 10-lobed, 10-grooved; styles connate, trifid; drupe about ½ in., globose, fleshy, smooth, yellow, stone 2-celled, brown, excavated on surface.

Dry region; rather common, *e.g.* Trincomalie and Anuradhapura. Cultivated elsewhere. Fl. greenish-white.

Also in India, and extending to Afghanistan, China, Trop. Africa, Malaya, and Australia; but much cultivated.

The cultivated tree is the only sort in the moist districts, and is usually known by its Portuguese name, 'Masan' (maça, an apple). The fruit of this is usually larger and more elongated, and the stone generally one-celled. The pulp has a pleasant sweetish flavour when fully ripe.

Wood pale reddish-brown, rather heavy, hard.

[*Z. Nummularia*, W. and A. is recorded by Vincent (Forest Report, par. 122) as a plant of our arid coast regions, but perhaps erroneously. It should be looked for, however.]

2. **Z. Œnoplia,*** *Mill. Gard. Dict.*, ed. 8 (1768). **Hin-eraminiya,** *S.* **Perilantai, Churai,** *T.*

Burm. Thes. 131. Fl. Zeyl. n. 88. *Rhamnus Œnoplia*, L. Sp. 194. Moon Cat. 17. Thw. Enum. 74. C. P. 1240.

Fl. B. Ind. i. 634. Burm. Thes. t. 61 (good).

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* It is difficult to conceive what Linnæus intended by applying this term to the present species, which has nothing vinous about it in any way.

A scrambling shrub, semi-scandent by its prickles, bark very rough, branchlets rufous-pubescent, becoming glabrous; l. numerous, distichous, 1¼–1¾ in., lanceolate or oval, very unequal-sided, acute and oblique at base, acute or rounded and apiculate at apex, entire or minutely denticulate, glabrous or closely pubescent above, silky with adpressed fulvous hair beneath, petiole short, hairy, prickles (usually only one developed) strong, short, compressed, hooked; fl. very small, crowded on the contracted branches of small, hairy, very shortly pedunculate, axillary, paniculate cymes, about ¼ in.; cal. very hairy; drupe small, ¼ in., ovoid, apiculate, black, shining.

Low country, chiefly in the dry region, where it is very common. Fl. March, April.

Also generally in Trop. Asia and Australia.

Some of the branches very often produce a mass of crowded slender branchlets covered closely with very small, nearly glabrous, membranous, pale green leaves very different from the normal ones, and with straight, slender, spinous stipules; such branches are flowerless. (I have seen a similar dimorphic state from Khasia.)

3. **Z. Napeca,** *Willd. Sp. Pl.* i. 1104 (1797). **Yak-eraminiya,** *S.*
Fl. Zeyl. n. 87. *Rhamnus Napeca*, L. Sp. Pl. 194. Trim. in Journ. Linn. Soc. xxiv. 137.
Fl. B. Ind. i. 635.

A shrub, young stems very woolly with rufous tomentum; l. oval, slightly oblique at base, abruptly acuminate, obtuse, finely serrulate, glabrous on both sides, shortly petioled, prickles solitary or in pairs, both recurved, short, stout, hairy, purple; cymes very rufous-hairy; styles 2, recurved; fruit not seen.

Var. β. **lucida,** *Moon Cat.* 17 (sp.). Thw. Enum. 74. *Z. Linnæi*, Laws. in Fl. B. Ind. i. 635. C. P. 1241.

Young stems much less tomentose; l. narrower, lanceolate, gradually acuminate, subacute, veins purplish, slightly hairy beneath, connecting transverse veinlets copious and conspicuous; cymes 1–1½ in., lax, rufous-hairy; styles 3 or 4, connate half-way up; fruit ⅝–¾ in., globose, fleshy, smooth, purple, stone very bony, rugulose, 3- or 4-celled.

Low country; rather rare. The type (only seen in Hermann's Herb.) presumably from Colombo. Var. β. Kalutara (Moon); Matale; Kurunegala, &c. Fl. July; pale greenish-yellow.

Endemic.

No one, since Hermann, appears to have met with the typical *Napeca*. Lawson states that his *Z. Linnæi* is the *R. Napeca* of Linn. Herb., but he bases the species on poor specimens from Walker in Herb. Kew, which seem to be merely a very glabrous form of *Z. lucida*.

4. **Z. xylopyra,** *Willd. Sp. Pl.* i. 1104 (1797). **Kakuru,** *S.* **Nari-ilantai,** *T.*
Thw. Enum. 74. C. P. 1243.
Fl. B. Ind. i. 634.

A small tree, with a round head, young branches woolly-pubescent; l. $1\frac{1}{2}$–3 in., very unequal-sided, oblong-oval or sub-rotund, very oblique, often cordate at base, very obtuse, often mucronate at apex, finely serrate, finely pubescent, becoming glabrous above, densely covered beneath with fine white or yellow tomentum, petiole $\frac{1}{4}$ in., woolly, prickles usually absent (when present, one straight the other curved); fl. in small, dense, woolly, dichotomous, axillary panicles $\frac{1}{2}$–1 in. long, peduncle about $\frac{1}{4}$ in.; cal. very woolly outside, segm. broad ovate, acuminate; ov. 3-celled, styles 3, distinct; fruit $\frac{3}{4}$–1 in., globular, covered with close, dense, grey tomentum, adherent base of cal. large, stone large, very thick and hard, pointed, excavated on surface, 3-celled, 3-seeded.

Dry country; rather rare. Jaffna; Kurunegala; Bintenne; about Nilgala, abundant and gregarious; Mulliativu Dist. (Broun). Fl. July. Also in India.

I have not seen any prickles on Ceylon specimens.

5. **Z. rugosa,** *Lam. Encycl.* iii. 319 (1789). **Maha-eraminiya,** *S.* **Churai,** *T.*
Thw. Enum. 73. C. P. 2719.
Fl. B. Ind. i. 636. Wight, Ic. t. 339.

A large straggling or climbing bush, with long virgate branches, fulvous-tomentose when young; l. 2–3 in., broadly oval or rotundate, unequal-sided, oblique at base, very shortly acuminate, denticulate, glabrous above, densely fulvous-tomentose becoming glabrous beneath, petiole $\frac{3}{8}$ in., tomentose, prickles usually solitary, numerous, strong, broad-based, recurved or nearly straight, hairy; fl. very small, numerous, in tomentose, pedunculate cymes about 1 in., arranged along one side of short, usually leafless, lateral branches; cal. hairy outside, lobes ovate; pet. 0; disk 5-lobed; styles 2, connate at base; fr. small, $\frac{1}{4}$ in., pyriform-globose, apiculate, smooth, stone very thin, 1-celled, 1-seeded.

Moist low country to 2000 ft.; common. Fl. greenish.
Also in E. Himalaya, Burma, and South India.

3. RHAMNUS, *L.*

Small trees or shrubs; l. alternate; fl. in axillary clusters; cal. 4- or 5-fid; pet. 5 or 0; disk inconspicuous, lining cal.-tube; stam. 4 or 5, inserted at mouth of cal.-tube (*perigynous*);

ov. quite free, 3- or 4-celled; styles 2–4, more or less connate; fruit a fleshy berry, with 3 or 4 hard pyrenes; seed with curved embryo, in scanty endosperm.—Sp. 60; 8 in *Fl. B. Ind.*

Pet. 0, stam 4. . . . . 1. R. ARNOTTIANUS.
Pet. and stam. 5 . . . . 2. R. WIGHTII.

1. **R. Arnottianus,** *Gardn. in Thw. Enum.* 74 (1858).
C. P. 201.
Fl. B. Ind. i. 638.

A small tree, young parts puberulous; l. 2–2½ in., ovate-lanceolate, acute or obtuse at base, acuminate, obtuse, sharply glandular-serrate, glabrous, coriaceous, venation reticulate, depressed above, prominent beneath, petiole ¼–½ in., stip. linear, soon falling, with a line of minute, erect, red, persistent glands within; fl. axillary, on long, slender, puberulous ped. longer than petiole; cal. pilose, segm. 4, very acute; pet. 0; stam. 4; styles 2 or 3, united at base; fr. ⅕ in., supported on cup-shaped, persistent, not adherent cal., pyriform-globose, apiculate, purple-black.

Upper montane zone; rather rare. Pedurutalagala; Horton Plains; Elk Plains; Nuwara Eliya. Fl. May.
Endemic.

2. **R. Wightii,** *W. and A. Prod.* 164 (1834).
Thw. Enum. 74. C. P. 2525.
Fl. B. Ind. i. 639. Wight, Ic. t. 159.

A large shrub, young parts puberulous; l. 2–3½ in., ovate-oval or ovate, rounded at base, acuminate, obtuse, apiculate, finely glandular-serrate, glabrous on both sides, petiole ½ in., stip. very early caducous; fl. on glabrous ped., shorter than petiole, 1–5 in axillary clusters; cal. glabrous, segm. 5, triangular; pet. 5, very small, spathulate; stam. 5; ov. 3- (or 4-) celled; styles 3 (or 4), connate half-way up); berry ⅕ in., globose, supported on flat, persistent cal.-tube, tipped with persistent styles, smooth, reddish-purple.

Upper montane zone; common. Fl. September; yellowish-green.
Also in the hills of Southern India.
Dries quite black.
Nearly allied to *R. Frangula*, the Alder-buckthorn of England.

4. SCUTIA, *Comm.*

Shrubs, often with axillary, hooked spines (abortive branches); l. alternate or sub-opposite; fl. in small axillary umbels; cal. 5-cleft; pet. 5, very small; disk inconspicuous,

lining cal.-tube; stam. 5, inserted at mouth of cal.-tube (*perigynous*); ov. free, 2–3-celled, styles connate; fruit a slightly fleshy berry, with 2 thin, woody pyrenes.—Sp. 8; 1 in *Fl. B. Ind.*

S. indica, *Brongn. in Ann. Sc. Nat., ser.* 1, x. 363 (1827). **Tavadi,** *T.*
Rhamnus circumscissus, L. f. Suppl. Pl. 152. *Ceanothus zeylanicus*, Heyne in Roth. Sp. Nov. 153. Thw. Enum. 75. C. P. 1233.
Fl. B. Ind. i. 640. Wight, Ill. i. t. 73. Bedd. Fl. Sylv. t. and xi. f. 1.

A bush, with numerous, straggling, divaricate branches, the younger ones usually provided with small, sharp, hooked axillary spines, young parts puberulous; l. $\frac{3}{4}$–$1\frac{1}{4}$ in., obovate-rotundate, acute at base, rounded or truncate, often emarginate at apex, faintly crenate in upper part, glabrous and shining above, paler beneath, coriaceous, petiole $\frac{1}{4}$ in., stip. linear-lanceolate, attenuate; fl. on very short glabrous ped., in small, very shortly pedunculate, axillary umbels as long as petioles; cal. glabrous, segm. lanceolate, acute; pet. very small, shorter than cal.-segm., bifid, enclosing stam.; stam. as long as pet.; berry over $\frac{1}{4}$ in., globular, apiculate, smooth.

Dry country; common. Abundant about Anuradhapura. Fl. March, September; pale green.
Also in S. India, Burma, and Mauritius.

5. SAGERETIA, *Brongn.*

Straggling shrubs, with straight axillary spines; l. opposite or nearly so; fl. small, in very lax panicles; cal. 5-fid, tube short; pet. 5, minute, involute; stam. 5, inserted outside disk; disk lining cal.-tube, margin free, 5-lobed; ov. free, 2-celled, style very short, 2-lobed; fruit a berry, with 2 coriaceous pyrenes.—Sp. 11; 3 in *Fl. B. Ind.*

S. costata, *Miq. Fl. Ind. Bat.* i. 645 (1855).
S. affinis, Thw. Enum. 410. *Berchemia parviflora*, Thw. Enum. 74. C. P. 2477.
Omitted in Fl. B. Ind.

A straggling shrub, with slender, divaricate branches, often with straight, blunt, deflexed, axillary spines, young shoots pubescent; l. opposite or sub-alternate, 3–5 in., oblong-oval, rounded at base, acuminate, acute, finely serrate-denticulate, glabrous on both sides, lat. veins 6–10, oblique, depressed above, prominent beneath, petiole $\frac{3}{8}$–$\frac{1}{2}$ in., spreading or deflexed; fl. sessile, in little clusters of 1–3, very laxly arranged in slender, filiform, slight-branched, pubescent

panicles 2–3 in., from the axils of the l., especially of the terminal pair; cal. glabrous, segm. triangular; pet. enclosing stam.; berry $\frac{1}{3}$ in., ovoid, supported on persistent cal., smooth, red.

Upper montane zone; rare. Maturata (Thwaites); Hakgala; Pedurutalagala. Fl. July, August; pinkish-white.

Also in Java. This may perhaps not be distinct from *S. hamosa*, Brongn., of Nepal and Peninsular India (see Fl. B. Ind. i. 641).

6. **COLUBRINA,** *Rich.*

Shrubs; l. alternate; fl. in small axillary cymes; cal. deeply 5-fid, tube hemispherical, enlarging in fruit; pet. 5; stam. 5, inserted outside disk; disk fleshy, filling cal.-tube; ov. half-inferior, immersed in disk, 3-celled, style 3-lobed; fruit a capsule, surrounded for lower third by closely adherent cal.-tube, 3-celled, septicidally dehiscent by 3 cartilaginous valves; seed with a straight embryo, in scanty endosperm.—Sp. 10; 3 in *Fl. B. Ind.*

C. asiatica, *Brongn. in Ann. Sc. Nat., ser.* 1, x. 369 (1827). **Tel-hiriya,** *S.* **Mayirmanikkam,** *T.*

Herm. Mus. 18. Burm. Thes. 111. Fl. Zeyl. n. 98. *Ceanothus asiaticus*, L. Sp. Pl. 196; Moon Cat. 17. Thw. Enum. 75. C. P. 1239.

Fl. B. Ind. i. 642. Burm. Thes. t. 48. Wight, Ill. i. t. 74. Bedd. Fl. Sylv. t. anal. x. f. 5.

A much-branched shrub, young parts glabrous; l. $1\frac{1}{2}$–$2\frac{1}{2}$ in., ovate, rounded or subcordate at base, acuminate, obtuse, crenate-serrate, glabrous, thin, somewhat 3-veined at base, petiole $\frac{1}{2}$–$\frac{3}{4}$ in.; fl. pedicellate, in small, axillary, nearly sessile cymes; cal. slightly hairy, segm. acute; pet. as long as sep., clawed, involute; disk lobed at margin; capsule globose, $\frac{3}{8}$ in., smooth; seeds dull, brownish-grey.

Dry region; rather common. Trincomalie; Batticaloa; Karativu I.; Kurunegala. Fl. greenish-yellow.

Throughout India and Malaya, and in Australia and S.W. Africa.

Hermann gives the name 'Wæl-mindi' for this, which seems to be properly the name of the grape-vine.

7. **GOUANIA,** *L.*

Climbing shrubs, with axillary, circinate tendrils (modified branches); l. alternate; fl. polygamous, in axillary and terminal spikes; cal. deeply 5-lobed, tube obconical, connate with ov.; pet. 5, involute; stam. 5, inserted outside disk;

disk lining cal.-tube and epigynous, margin free; ov. *quite inferior* and covered by disk, 3-celled, style 3-lobed; fruit inferior, crowned by persistent cal.-lobes, bluntly 3-winged and separating from a central, tripartite, filiform axis into 3 indehiscent mericarps.—Sp. 30; 3 in *Fl. B. Ind.*

G. microcarpa, *DC. Prod.* ii. 40 (1825).
Thw. Enum. 75. C. P. 1238.
Fl. B. Ind. i. 643.

A shrub, climbing by short, circinate, axillary tendrils, branchlets (including tendrils) pubescent; l. 2–3 in., ovate-oval, rounded at base, shortly acuminate, acute, entire, glabrous, lat. veins 4 or 5 on each side, conspicuous, much curved, intermediate reticulations extremely fine; male fl. sessile, fem. fl. on short woolly ped., in little clusters, laxly arranged on narrow, elongated, spicate branches of terminal and axillary panicles 4–9 in. long, collectively forming a large terminal infl.; cal. densely tomentose, segm. triangular; disk pubescent, angles truncate; fr. $\frac{1}{4}$ in. long by nearly $\frac{1}{2}$ in. wide, at first pubescent, afterwards glabrous and shining, wings thick, rounded at top and bottom, parchment-like.

Low country up to 2000 ft.; common. Fl. Jan.
Also in S. India and at Malacca.
The appearance of the fruit is singularly like that of a *Dioscorea;* but its structure is more similar to that of an Umbellifer, but with 3 mericarps instead of 2.

XXXIX.—AMPELIDEÆ.

SHRUBS or perennial herbs, usually climbing; l. alt., with stip.; fl. small, regular, bisexual or rarely unisexual; cal. cup-shaped, entire or slightly 4–5-lobed; pet. 4 or 5, distinct or connate, valvate, usually caducous; stam. 4 or 5, inserted opp. the pet., distinct and free or completely connate into a tube adnate to pet.; disk large, cupular or annular (in *Leea* adnate to pet.); ov. free or somewhat adnate to disk, 2-celled, with 2 collateral ovules (*Vitis*), or 6-celled, with 1 ovule in each cell (*Leea*); fruit a berry; seed with copious endosperm.

Stam. distinct, free . . . . 1. VITIS.
Stam. connate into a tube, adnate to pet. . . . . . 2. LEEA.

Of the 20 species, only 2, *Vitis Gardneri* and *V. lanceolaria*, are found in the montane zone; the rest are plants of the low country; 4 are confined to the dry region, viz., *V. tomentosa*, *quadrangularis*, *Linnæi*, and *setosa*.

1. **VITIS,** *L.* (including *Cissus*, *L.*).

Shrubs or perennial herbs, climbing by means of tendrils (barren inflorescences); l. alternate, stipulate; fl. bisexual or unisexual, often in little umbels arranged in paniculate or corymbose cymes usually opp. the l., rarely axillary, sometimes terminating lat. branches; cal. cup-shaped, truncate or scarcely lobed; pet. 4 (rarely 5), distinct at base, valvate, soon falling; stam. 4 (rarely 5), inserted outside disk, opp. the pet.; disk large, usually cupular or annular, lobed; ov. usually adnate to base of disk, 2-celled, with 2 collateral ovules in each cell, style simple; fruit a pulpy berry, with 1–4 erect seeds; seed with the testa usually projected inwards, forming a septum, embryo small, straight, in copious endosperm.—Sp. 375 (Planchon); 75 in *Fl. B. Ind.*

The species here (following Fl. B. Ind.) included under the genus *Vitis* are, in the most recent account of the Family by Planchon (Mon. Phaner. v. (1883), distributed under the genera *Ampelocissus*, *Tetrastigma*, and *Cissus*, and we have no species of *Vitis*, as restricted by him, in Ceylon.

Pet. 5, fl. polygamo-monœcious, infl. with a tendril (*Ampelocissus*).
  L. 3-lobed, floccose on both sides . . 1. V. TOMENTOSA.
  L. ovate, glabrous above . . . . . 2. V. ERIOCLADA.
Pet. 4, fl. bisexual, stigma minute (*Cissus*).
  L. simple (often 3-foliolate in *V. Rheedii*).
    Stems 4-angled.
      L. very obtuse . . . . . . 3. V. QUADRANGULARIS.
      L. acute.
        Angles strongly winged . . . 4. V. GLYPTOCARPA.
        Angles not winged . . . . 5. V. LONCHIPHYLLA.
    Stems cylindrical.
      L. pubescent or tomentose beneath.
        L. not lobed . . . . . . 6. V. ADNATA.
        L. 3–5 lobed . . . . . . 7. V. LINNÆI.
      L. glabrous or nearly so.
        L. not lobed.
          L. obtuse, thick . . . . . 8. V. PALLIDA.
          L. acute, thin, broader than long . 9. V. REPANDA.
          L. gradually acuminate, longer than broad . . . . 10. V. ACUMINATA.
        L. 3–5 lobed.
          Berry globular, $\frac{3}{4}$ in. . . . 11. V. HEYNEANA.
          Berry ovoid, $\frac{3}{8}$ in. . . . . 12. V. RHEEDII.

L. compound.
 Fruit smooth.
  L. simply 3-foliolate.
   Fl. umbellato-cymose . . . . 13. V. GARDNERI.
   Cymes dichotomous.
    Lflts. small, rotundate, thick . . 14. V. CARNOSA.
    Lflts. large, acuminate, thin . . 15. V. RETICULATA.
  L. usually pedate.
   Stem and l. pubescent . . . 16. V. PEDATA.
   Stem and l. glabrous . . . . 17. V. TENUIFOLIA.
 Fruit hispid . . . . 18. V. SETOSA.
Pet. 4, fl. diœcious, stigma dilated, 4-lobed (*Tetrastigma*) . . . . 19. V. LANCEOLARIA.

It is probable that we have other species here not yet clearly distinguished.

1. **V. tomentosa,** *Heyne in Roth. Sp. Nov.* 157 (1821).

Trim. in Journ. Bot. xxiii. 144. *Ampelocissus tomentosa*, Planch. l. c. 377.

Fl. B. Ind. i. 650 (not given for Ceylon). Wight, Ill. i. t. 57 (not good).

Stems stout, white-pruinose, nearly glabrous, tendrils long, bifid ; l. 3–4 in., rather broader than long, somewhat cordate at base, with a very wide sinus, 3-lobed, coarsely serrate-dentate, floccose with scanty, white, cobwebby wool, lobes ovate, acute, middle one smallest, petiole 1–1½ in., stip. short, truncate; fl. small, sessile, crowded, in pyramidal, paniculate, much-branched cymes 1–2 in. long, ending stiff, divaricate, leaf-opposed peduncles, with a long bifid tendril below the cyme, buds broadly oblong, truncate ; cal. nearly glabrous ; ov. conical, 10-grooved at summit; berry not seen.

Dry country; very rare. Anuradhapura ; Mihintale. Fl. Aug., Sept.; dark vinous-red.

Also in S. India.

Our plant appears to be much less tomentose than the Indian one.

2. **V. indica,** *L. Sp. Pl.* 202 (1753). **To-wel, Rata-bulat-wel,** *S.*

Burm. Thes. 230. Fl. Zeyl. n. 99. Moon Cat. 18. Thw. Enum. 63. C. P. 1184.

Fl. B. Ind. i. 651 (*V. erioclada*, W. & A.) Rheede, Hort. Mal. vii. t. 6.

Stems stout, semi-woody, cylindrical, floccose-woolly, tendrils 6 in. or more, simple, woolly ; l. 4–6 in., broadly cordate-ovate, with a rather narrow sinus and rounded lobes, very acute, very coarsely glandular-dentate, glabrous above, woolly with rufous or grey tomentum on the prominent veins beneath, margin slightly reflexed, cottony beneath, petiole 3 in., densely floccose-woolly ; fl. sessile, in dense clusters

surrounded with rufous wool, on the thick, very woolly branches of a paniculate cyme 3–4 in. long, on a peduncle 2–3 in., usually with a simple tendril below the cyme, buds broadly oblong-ovoid; stam. twice as long as ov.; ov. flat on top, 10-grooved; berry $\frac{3}{4}$ in., oblong-ovoid, smooth, purple.

Moist low country up to 2500 ft.; common. Fl. December.
Also in Western Peninsular India.
The fruit of this very much resembles that of the true grape-vine, *V. vinifera*, but is bitter in taste.
Rheede's figure above quoted well represents our plant; his t. 7 quoted for *V. erioclada* by W. & A. (followed by Lawson, who quotes it again under *V. latifolia*, however) is another species with lobed leaves.
The name *V. indica*, L. is given in Fl. B. Ind. to a different species (from South India) called *Ampelocissus Arnottiana* by Planchon. Linnæus' name has been used for other species also, but Hermann's specimens conclusively show that Thwaites correctly applied it to the present one. Though Planchon casually alludes to his *Ampelocissus erioclada* (l. c. pp. 380, 622), he appears to have accidentally omitted it altogether from the body of his monograph.

3. **V. quadrangularis,** *Wall. Cat.* n. 5992 (1828). **Hiressa,** *S.* **Pirandai,** *T.*
Cissus quadrangularis, L., Moon Cat. 11. *Cissus edulis*, Dalz., Thw. Enum. 62. C. P. 1174.
Fl. B. Ind. i. 645. Wight, Ic. t. 51.

Stems very long, not woody, thick, sharply compressed, quadrangular but scarcely winged, the sides concave, much branched, jointed by contractions at the nodes, glabrous, green, fleshy, the younger ones square on section and with winged angles, tendrils long, slender, simple; l. distant, few, 1–2 in., broadly ovate or rotundate-deltoid, truncate at base, very obtuse, distantly spinous-crenate, glabrous, thick, petiole $\frac{1}{4}$–$\frac{1}{2}$ in., subquadrangular, stip. small, broadly oval, obtuse; fl. pedicellate, in small umbels on branches of a short, paniculate cyme; pet. ovate, acute; style short, blunt; berry globose, apiculate, red.

Dry region; very common.
Also in India, Malay Peninsula, Java, and Trop. Africa.
The stems are often leafless and extend to a very great length over trees and bushes. They are an article of food both fried and curried.

4. **V. glyptocarpa,** *Laws. Fl. B. Ind.* i. 645 (1875).
Cissus glyptocarpa, Thw. Enum. 62; Planch. l. c. 501. C. P. 1183.
Fl. B. Ind. i. 645.

Stems slender, herbaceous, strongly 4-winged, glabrous, tendrils slender, bifid; l. 2–3 in., ovate, very broad and truncate or subcordate at base, acuminate, acute, distantly and shallowly spinous-serrate, glabrous and shining, dotted (when

dry) on both sides with minute white crystals (cystoliths), petiole 1 in., quadrangular, stip. ovate, acute, concave; fl. small, on glabrous ped., cymes rather longer than petiole, umbellate with 3–5 rays; pet. acute, reflexed; ov. 4-sulcate, stigma bilobed; berry oblique-pyriform, apiculate, $\frac{3}{8}$ in., purple; seed solitary, pyriform, 2-grooved in front, gibbous on back with 3 vertical ridges connected by transverse ones.

Low country; rather common up to 2000 ft. Batticaloa (Gardner); Deltota; Nillembe; Peradeniya. Fl. Jan., Feb.; pink.

Endemic.

Easily recognised by the ribbed and rugose seeds and the minute white points (cystoliths) in the leaves.

Thwaites appears to have distributed to the Paris Herbarium, under C. P. 1183, some fruiting specimens labelled '*C. Heyneana.*' These are described by Planch. (l. c. 502) as *C. Thwaitesii* and characterised by having the cymes much shorter than the long petioles, and pale glaucous leaves. I have not seen this.

5. **V. lonchiphylla,** *Laws. Fl. B. Ind.* i. 646 (1875).
Cissus lonchiphylla, Thw. Enum. 62; Planch. l. c. 501. C. P. 1177.
Fl. B. Ind. i. 646.

Stems moderately stout, quadrangular, not winged, glabrous; l. 4–6 in., ovate- or lanceolate-oblong, rounded or somewhat truncate at base, acuminate, acute, distantly and shallowly serrate, glabrous and shining, 3-veined at base, petiole under $\frac{1}{2}$ in., stip. cordate-ovate, obtuse; fl. on long ped., cymes much longer than petiole, lax, paniculate, divaricate, glabrous; cal. large, with margin expanded; pet. reflexed; berry $\frac{1}{3}$ in., depressed-globose.

Moist low country; rather rare. Ambagamuwa; Colombo; Pasdun Korale; Kuruwita Korale. Fl. June; pinkish-white.

Endemic.

6. **V. adnata,** *Wall. Cat.* n. 5998 (1828).
Cissus adnata, Roxb., Thw. Enum. 62. C. P. 3450.
Fl. B. Ind. i. 649. Wight, Ic. t. 144.

Stems slender, cylindrical, at first covered with orange tomentum, afterwards glabrous, tendrils forked, woolly; l. 2–3 in., broadly ovate, cordate or wide-truncate at base, shortly acuminate, acute, spinous-serrate, nearly glabrous above (when full-grown), densely covered with orange tomentum beneath, petiole about 1 in., very tomentose, stip. broad, obtuse, membranous, hairy; fl. on slender, hairy, rather drooping ped., cymes paniculate, orange-tomentose, peduncle exceeding petiole; berry $\frac{1}{4}$ in., on recurved stalk, pyriform, apiculate.

Moist low country; rather rare. Near Sittawaka; Kuruwita Korale. Fl. April; green.

Widely distributed in Trop. Asia, also in Madagascar.

7. **V. Linnæi,** *Wall. Cat.* n. 5987 (1828). **Wal-niviti,** *S.* **Kaddumuntiri,** *T.*

Fl. Zeyl. n. 60. *Cissus vitiginea*, L. Sp. Pl. 117; Planch. l. c. 472; Moon Cat. 11. *Cissus angulata*, Lam., Thw. Enum. 62. C. P. 1181.

Fl. B. Ind. i. 649. Plukenet, Mant. t. 337, f. 2 (poor).

Old stems woody with smooth bark, branches rather short, stout, densely pubescent, tendrils stout, pubescent simple or pinnately branched; l. $1\frac{1}{2}$–$3\frac{1}{2}$ in., variable, rotundate-ovate, cordate or truncate at base, obtuse or acute, shallowly or deeply palmately 3–5-lobed, sharply and irregularly dentate, finely pubescent above, softly and densely glandular-pubescent and white beneath, petiole variable in length, densely pubescent, stip. large, ovate, obtuse, pubescent outside, membranous; fl. on long spreading or slightly drooping, unequal ped., cymes about as long as petiole, 3–5-branched, pubescent; cal. pubescent; ov. 4-lobed, style as long as ov.; berry $\frac{3}{8}$ in., obovate-ovoid, drooping, apiculate, glabrous, blue with a glaucous 'bloom.'

Dry and desert regions; very common. Fl. July–September; greenish.

Also in Southern India.

This is the original type of the genus *Cissus*, L. It varies a good deal in depth of the leaf-lobing and amount of pubescence. The leaves have a pleasant scent like those of the grape-vine when bruised.

8. **V. pallida,** *W. and A. Prod.* 125 (1834).

Cissus repens, Thw. Enum. 62 (non Lam.). *C. pallida*, Planch. l. c. 477. C. P. 1180.

Fl. B. Ind. i. 647 (not given for Ceylon). Rheede, Hort. Mal. vii. t. 48 (?).

Stems semi-woody below, cylindrical or nearly so, branches slightly puberulous or quite glabrous, tendrils very long, simple; l. 2–4 in., broadly ovate, cordate with a very wide sinus or truncate at base, shortly acuminate, obtuse, sharply and shallowly spinous-serrate, perfectly glabrous and shining on both sides, rather thick, pale green, petiole $1\frac{1}{2}$ in., stip. broadly oblong, obtuse, membranous, caducous; fl. on slender ped. in little umbels, cymes pedunculate, shorter than petiole; pet. reflexed; berry $\frac{1}{3}$ in., globose-pyriform, on a fleshy stalk.

'Warmer parts of the island, not uncommon' (Thwaites). There is no locality to the C. P. specimens, and I have not met with the plant, except in the Botanic Garden. Fl. Sept.–Dec.; pinkish.

Also in Southern India.

I am little acquainted with this, and follow Planchon. Lawson refers Thwaites' plant to *V. repanda*.

Rheede's figure seems to fit our specimens very well, but is usually quoted for *C. repens*, Lam.

9. **V. repanda,** *W. and A. Prod.* 125 (1834). **Wal-diyalabu,** *S.*
Cissus latifolia, Moon Cat. 11 (? Vahl). C. P. 3962.
Fl. B. Ind. i. 648. Rheede, Hort. Malab. vii. t. 11. (good).

Stems cylindrical, woody below, glabrous, white-pruinose, young parts slightly rusty-hairy, tendrils deciduous; l. 3–6 in., broader than long, cordate-ovate, with a narrow or wide sinus, suddenly and narrowly acuminate, acute, margin somewhat repand, sharply spinous-serrate, glabrous on both sides or slightly pubescent on veins beneath, rather thin, petiole 1–2½ in., glabrous or slightly pubescent, stip. large, thick and wart-like, persistent, with a short, blunt, scarious margin; cymes lax, much longer than petioles, paniculate, ped. slender, puberulous; cal. truncate, pubescent; ov. flat-topped; berry ½ in., pyriform, apiculate.

Low country; rather common, chiefly in the dry region. Trincomalie; Dambulla; Jaffna; Galle. Fl. March, April.

Also in S. India.

I feel much doubt as to the name of this; Planchon does not give *V. repanda* for Ceylon. Rheede's figure is referred in Fl. B. Ind. to *V. glauca.* W. and A. The solid stipules in our plant are very remarkable. *Cissus vitiginea,* L. and *C. repens,* Thw. are wrongly referred to *V. repanda* in Fl. B. Ind.

10. **V. acuminata,** *Trim.*
Cissus acuminata, Thw. Enum. 62. C. P. 3451.
Fl. B. Ind. i. 648 (under *V. repanda*).

Stems cylindrical, smooth, young parts very glabrous, tendrils short, much branched, provided with large peltate disks; l. 4–6 in., ovate or ovate-lanceolate, slightly cordate at base, gradually acuminate, acute, distantly and slightly spinous-serrate, glabrous and shining especially beneath, sometimes slightly pilose on veins above, very thin, petioles 2–3 in., stip. broad, peltate-cordate, finely ciliate, scarious; cymes shorter than the petioles; fl. umbellate, ped. rather long, rusty-pilose; berry not seen.

Moist low country; rare. Ratnapura District (Thw.); frequent about Eratne, &c., Kuruwita Korale. Fl. April.

Endemic.

This is combined with *V. repanda* in Fl. B. Ind., but seems quite distinct, though I have but scanty material. It is a forest species, and climbs like the 'Virginia creeper' by the large disks at the ends of the tendril-branches.

The species is not given in Planchon's Monograph, nor is C. P. 3451 quoted there.

11. **V. Heyneana,** *Wall. Cat.* n. 5988 (1828).
V. pallida (?), Trim. Cat. Ceyl. Pl. 19 (non W. & A.) *Cissus glauca,* Thw. Enum. 62; Planch. l. c. 476 (non Roxb.). C. P. 2939.
Fl. B. Ind. i. 647.

Stem very stout, woody below, with white bark, far-climbing, branches quite glabrous, shining, pale green or glaucous, cylindrical, tendrils stout, long, simple, usually deciduous by a clean scar; l. variable, lower ones 6 in. long by 8 in. wide, palmately 5-lobed, lobes triangular, acute, upper ones 3–5 in., ovate or often slightly 3-lobed, acute, all coarsely and distantly spinous-serrate, quite glabrous and shining, somewhat glaucous beneath, rather thick, petiole of lower l. 5–6 in., of upper ones 1–2 in., cylindrical, very smooth, stip. broadly oblong, obtuse, very caducous; fl. rather large on long pubescent ped., cymes few-fld., about equalling petiole; pet. reflexed, with an inflexed apex; ov. strongly 4-angled; berry $\frac{3}{4}$ in., globular, purple-black, shining.

Low country; common up to 2000 ft. Fl. June; pink.

Also in Southern India.

This is a very large and vigorous vine, abundant about Kandy, with handsome foliage and purple-black fruit as large as a small cherry. The rope-like white-barked stems are often $2\frac{1}{2}$ in. in diameter. There is some doubt as to its correct name. The fruits are not obovate or pyriform when fresh, but take that form after drying.

12. **V. Rheedii,** *W. and A. Prod.* 127 (1834).
Cissus trilobata, Lam., Thw. Enum. 62; Planch. l. c. 503. C. P. 1182.
Fl. B. Ind. i. 653. Rheede, Hort. Mal. vii. t. 45.

Stems stout, cylindrical, slightly rough, glabrous; l. very variable, mostly simple, ovate, subcordate or rounded at base, 3-veined, more or less deeply 3-lobed, often compound, 3-foliolate, with shortly stalked lflts., all acuminate, acute, spinous-serrate, glabrous on both sides, thin, petiole 1–3 in.; fl. rather large, pedicellate, cymes stalked, usually exceeding petiole, numerous near end of branch and the last one terminating it, dichotomously branched, divaricate; pet. obtuse, spreading; style long; berry $\frac{3}{8}$ in., ovoid.

Moist low country; rather common. Heneratgoda; Reigam Korale. Fl. May–September; pinkish.

Also on the Malabar coast.

The leaves in this species are found both simple (entire or 3-lobed) and compound (3-foliolate) on the same plant.

13. **V. Gardneri,** *Laws. Fl. B. Ind.* i. 656 (1875).
Cissus Gardneri, Thw. Enum. 63; Planch. l. c. 515. C. P. 1176.
Fl. B. Ind. i. 656.

Stems slender, terete, striate, glabrous, reddish; l. 3-foliolate, petiole 1–2 in., lflts. very shortly stalked, unequal, oblong-oval, acute at base (the lateral ones oblique), acute, mucronate, distantly spinous-serrate, glabrous, rather thick, veins stout,

conspicuous beneath, stip. oblong, cordate, persistent; fl. rather large, pedicellate, in small umbels, cymes lax, slender, corymbose, glabrous, pink, peduncle longer or shorter than petiole; pet. obtuse, spreading; style long; berry about ½ in., nearly globular, apiculate, smooth, purple.

Lower montane zone; rather rare. Ramboda; Hunasgiriya; Matale. Fl. Dec.–April; pinkish yellow.

Endemic.

According to Planchon (l. c. 515), another plant, allied to *V. pedata*, has also been distributed under the name of *V. Gardneri*. The true plant is very nearly allied to *V. Rheedii*, but the inflor. seems to be never terminal.

14. **V. carnosa,** *Wall. Cat.* n. 6018 (1828). **Walratdiyalabu,** *S.*
Cissus carnosa, Lam., Moon Cat. 11; Thw. Enum. 63; Planch. l. c. 570. C. P. 2938.
Fl. B. Ind. i. 654. Wight, Ic. t. 171.

Stems slender, much-branched, angular, quite glabrous, tendrils long, slender, branched, young shoots glabrous, red; l. 3-foliolate, peduncle 1¼–1¾ in., channelled above, lflts. small, stalked (the middle one the largest and on longer stalk), broadly oval or rotundate, rounded at base, acute or obtuse, very coarsely crenate-serrate, glabrous and shining, thick, stip. small, ovate, acute; fl. shortly pedicellate, cymes di- or trichotomous, lax, divaricate, terminating lateral branches, peduncle 2½–3 in., glabrous; pet. acute, spreading; berry ¾ in. or more, depressed-globose, smooth, purple, 3- or 4-seeded, very juicy; seed acutely trigonous, sharply pointed, bluntly muricated on back.

Low country in both moist and dry regions; rather common. Galle; Reigam Korale; Medamahanuwara; Kantalai. Fl. July–September; green.

Throughout Tropical Asia and Australia.

V. trifolia, L. seems to be this, and, if so, is the oldest name. This and the three following species come under Planchon's section *Cayratia* of *Cissus*.

15. **V. reticulata,** *Laws. Fl. B. Ind.* i. 655 (1875).
Cissus reticulata, Thw. Enum. 63. *C. retivenia*, Planch. Mon. Phan. v. 576. C. P. 2857.
Fl. B. Ind. i. 655.

A very large climber, stems cylindrical, glabrous, purplish, tendrils slender, forked; l. large, 3-foliolate, petiole 1½–2 in., lflts. equal, stalked (the middle stalk the longest), 4–6 in., ovate-oval, acute at base, suddenly acuminate, cuspidate, faintly repand-dentate, usually quite glabrous, thin, venation prominent, reticulate; fl. pedicellate, cymes axillary, di- or trichotomously branched, lax, longer than petioles; berry

large, $\frac{7}{8}$ in. long, ovate-ovoid, blunt, pinkish-cream-coloured, pendulous; seeds oblong, smooth.

Moist low country; rare. Ambagamuwa; Pasdun Korale; Kottawa, S. Prov. Fl. March, April; white.

Endemic. A very distinct species. Specimens under this same C. P. number (in Hb. Perad.), with narrower lflts. pubescent beneath, are probably a different species.

Thwaites' specific name has clear claim to retention, as Blume's *C. reticulata* was only in MS. till printed in Planchon's Monograph.

16. **V. pedata,** *Vahl. ex Wall. Cat.* n. 6027 (1828). **Médiya-wel,** *S.*
Cissus pedata, Lam., Moon Cat. 11. Thw. Enum. 63; Planch. l. c. 558. C. P. 1175.
Fl. B. Ind. i. 661.

Stems weak, cylindrical, striate, usually covered with short pubescence mixed with longer brown spreading hairs, tendrils long, forked, very slender, young parts tomentose; l. large, 3-foliolate, the lateral lflts. usually pedately compound, petiole 2–3 in., pubescent and hairy like the stem, cent. lflt. long-stalked, lat. lflts. shortly stalked, rarely simple, usually divided into 2, 3, or 4 lflts., which are unequal, nearly sessile or shortly stalked, all lflts. acute and often oblique at base, shortly acuminate, acute, coarsely and shallowly repand-dentate, more or less pubescent on both sides, especially beneath; fl. on short pubescent ped., cyme corymbose, shortly pedunculate, dichotomous, lax, spreading, axillary, shorter or longer than petiole; cal. very shallow; pet. usually 4 (rarely 5), hooded and slightly coherent at top, pubescent outside, soon falling; berry $\frac{1}{2}$ in., depressed - globose, cream - coloured, 2–4-seeded; seed semi-globose, smooth.

Low country, in both regions; very common. Fl. July; white.
Found throughout Tropical Asia.

17. **V. tenuifolia,** *W. and A. Prod.* 129 (1834).
Cissus tenuifolia, Heyne, Planch. l. c. 563. C. P. 2725.
Fl. B. Ind. i. 660 (not given for Ceylon).

Stems slender, striate, quite glabrous, tendrils forked; l. 3-foliolate, the lat. lflts. usually pedately compound with 2 or 3 distinct lflts., petiole $1\frac{1}{2}$–$2\frac{1}{2}$ in., all lflts. stalked (the central stalk the longest), lanceolate, acute at both ends, acuminate, shallowly repand-serrate, quite glabrous, thin; cymes axillary, dichotomously branched, lax, divaricate, longer or shorter than petiole, glabrous or nearly so; berry $\frac{3}{8}$–$\frac{1}{2}$ in., depressed-globose, cream-coloured, 1–4-seeded; seed semi-globose, very convex on back, flat on face, smooth.

Low country in both moist and dry regions; probably common. Hewahetta; Nitre Cave Dist. Fl. Aug., Sept.

Also in South India and China.

Thwaites does not distinguish this from *C. pedata*, and it is difficult to find good characters to separate them; though in Fl. B. Ind. they stand in different sections of the genus.

18. **V. setosa,** *Wall. Cat.* 6009 (1828). **Anaittadichchal,** *T.*
Cissus setosa, Roxb., Thw. Enum. 63. Planch. l. c. 608. C. P. 1179.
Fl. B. Ind. i. 654. Wight, Ic. t. 170.

Stems prostrate, weak, branched, succulent, zigzag, striate, hispid with glandular hairs, tendrils long, forked; l. 3-foliolate (rarely simple), sessile, lflts. shortly stalked, obovate-oblong, cuneate at base, obtuse, irregularly toothed or laciniate, succulent, glabrous above, glandular hispid on the veins beneath, pale green, the central one narrower and on longer stalk, stip. broad-ovate, acute; fl. small, on long glandular ped., cymes terminating lateral branches, dichotomous, lax, divaricate, peduncle $1\frac{1}{2}$–4 in. long, glandular-hispid; cal. loose, truncate; pet. contracted in the middle, hooded, ultimately reflexed; berry over $\frac{1}{4}$ in., ovoid, strongly glandular-hispid, scarlet.

Desert districts; rather common. Jaffna, abundant; Puttalam (Nevill); Hambantota, Kirinda, &c., abundant; Matalan, N. Prov. (Nevill); Mannar. Fl. Nov., Dec.

Also in Southern India.

This is the only species we have of Planchon's large section *Cyphostemma*, which is mostly African. The scarlet hispid fruit is acid at first taste, but afterwards very burning and acrid.

Planchon says the cymes are axillary; in appearance they are usually terminal, and certainly sometimes leaf-opposed.

19. **V. lanceolaria,** *Wall. Cat.* 6013 (1828).
Cissus lanceolaria, Roxb. Thw. Enum. 63. *Tetrastigma lanceolarium*, Planch. l. c. 423. C. P. 3597.
Fl. B. Ind. i. 660. Wight, Ic. tt. 28 (♀), 177 (♂), and 740 (*V. muricata*).

Stems woody below, cylindrical or somewhat compressed, glabrous, with copious brown lenticels, young parts quite glabrous, tendrils long, very slender, simple; l. 3-foliolate, the lat. lflts. often pedately 2-foliolate, petiole about 1 in., lflts. shortly stalked, lanceolate or oval, acute or tapering at both ends, coarsely and irregularly serrate, glabrous, thick, dark green, stip. lanceolate, acute, membranous; fl. diœcious, male cymes lax, paniculate, longer than petiole, female cymes denser, corymbose, shorter than petiole, all axillary, at first covered with short tomentose pubescence; pet. acute, thickened at apex; style very short, stigma large, dilated, 4-lobed;

berry about ½ in., globose, cream-coloured, 2–4-seeded; seed ovoid, pointed, flattened on one side, back very convex, grooved down the centre, transversely rugose.

Var. β. **glycosmoides,** *Planch.* l. c. 426 (sp.). *C. verrucosa,* Moon Cat. 11 (?). *Cissus muricata,* var. *minor,* Thw. Enum. 63. C. P. 1178.

Smaller, more copiously lenticellate; l. usually reduced to a single lflt., more rarely 3-foliolate, lflts. broader, less serrate, berry rather smaller; seed less strongly rugose.

Montane zone up to 6000 ft.; rather rare (?) Hakgala; Dimbula. Var. β. in the low moist country up to 3000 ft.; common. Fl. Feb.–April; greenish-white.

Throughout Peninsular India, and in Malay Peninsula and Java; var. β. endemic.

The leaves, especially in var. *glycosmoides,* are very often unifoliate, but this is insufficient for the separation of another species.

Planchon's *Tetrastigma,* to which genus this belongs, is distinguished by its dilated 4-lobed stigma and polygamo-diœcious fl.

2. **LEEA,*** *L.*

Semi-shrubby perennials, not climbing; l. alternate, compound, stipulate; fl. bisexual, in terminal or leaf-opposed cymes; cal. cup-shaped, 5-lobed; pet. 5, connate below into a cup-shaped tube; stam. 5, connate below into a wide tube, which is adnate below to tube of the pet. and deeply 5-lobed at mouth, anth. on inside of tube, alternate with the lobes and opp. the pet., connate by their edges; ov. 6-celled, with 1 erect ovule in each cell, style simple; fruit a 3–6-seeded berry; seed with horny endosperm.—Sp. 25; 15 in *Fl. B. Ind.*

L. sambucina, *Willd. Sp. Pl.* i. 1177 (1797). **Burulla, Gurulla,** *S.*

Aquilicia Otillis, Gaertn. Fruct. i. 275. *Leea Otillis,* DC. Prod. i. 636. Moon Cat. 18. *L. Staphylea,* Roxb., Thw. Enum. 64. C. P. 732.

Fl. B. Ind. i. 667. Wight, Ic. t. 78. Gaertn. Fruct. t. 57, f. 7 (*Otillis zeylanica*).

A large semishrubby perennial, 4-6 ft., stems cylindrical, branched, sulcate, usually rough with small prominences, glabrous; l. pinnate or bi-pinnate, very large, 1½–3 ft., petiole and rachis glabrous, furrowed, rough like the stem, thickened

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* Commemorates James Lee, nurseryman, of Hammersmith, who, by his 'Introduction to Botany' (1760), brought the Linnean system into England. Died 1795.

at the base and joints, lflts. stalked, opposite, lanceolate-oblong, acute at base, acuminate, strongly serrate, glabrous, lat. veins very prominent, arched, stip. united to petiole, large, sheathing, deciduous; fl. $\frac{3}{8}$ in., very shortly pedicellate, in large, branched, corymbose cymes opposite the terminal leaf; pet. hooded at apex, reflexed; tube of stam. large, dome-shaped; berry $\frac{1}{2}$ in., depressed-globular, smooth, shining, purple-black.

Low country; very common. Fl. November; greenish-white. Throughout the Eastern Tropics.

The leaves have a pleasant scent, like apples, when bruised. They turn black in drying.

The plant has an evil reputation among the Sinhalese, and is considered to have a bad influence over cattle.

XL.—SAPINDACEÆ.

TREES or shrubs (rarely herbs); l. alternate, without stip. (in *Turpinia* opp. with stip.), usually compound; fl. generally small, regular or irregular, polygamous or diœcious (rarely bisexual); sep. 4–5, distinct and imbricate, or connate into a 4–6-lobed valvate cal.; pet. 4 or 5, distinct, sometimes unequal, often with a scale at the base, or 0; disk annular or unilateral; stam. usually 8, often 5 or 10, inserted inside (rarely on) the disk, or unilateral, fil. distinct, rarely slightly connate at base; ov. 2- or 3-celled, with 1 or 2 (rarely more) erect or ascending ovules in each cell; fruit either syncarpous and generally indehiscent, more rarely capsular, or of 1–3 indehiscent carp.; seed with or without an aril, without endosperm (except *Turpinia*).

L. alternate, without stip.; seeds without endosperm.
  Fl. irregular, disk unilateral.
    Herbs; fr. an inflated capsule . . . . 1. CARDIOSPERMUM.
    Trees or shrubs; fr. indehiscent.
      L. pinnate . . . . 2. HEMIGYROSA.
      L. 3-foliolate or simple . . . . 3. ALLOPHYLUS.
  Fl. regular, disk annular.
    Stam. inserted inside disk; fr. not winged.
      Fr. not inflated; fl. very small.
        Fr. syncarpous, indehiscent.
          Pet. 0; seed with an aril . . . 4. SCHLEICHERA.
          Pet. 5; seed without an aril . . 5. GLENIEA.

Fr. of 1–3 indehiscent cocci.
Sep. much imbricate . . . . . 6. SAPINDUS.
Sep. valvate or nearly so.
Stam (in male fl.) 10. . . . . 7. NEPHELIUM.
Stam. 5 . . . . 8. POMETIA.
Fr. an inflated capsule; fl. rather large . 9. HARPULLIA.
Stam. inserted outside disk; fr. 3-winged . 10. DODONÆA.
L. opposite, stipulate; seeds with endosperm (*Staphyleæ*) . . . . 11. TURPINIA.

All our 19 species are natives of the low country; 2 species of *Sapindus*, 1 of *Nephelium*, and 1 of *Cardiospermum* are confined to the dry region, and *Gleniea* is nearly so; 3 species of *Sapindus*, 1 of *Allophylus*, *Pometia*, and *Harpullia* occur only in the moist region; *Allophylus zeylanicus* and *Turpinia* have montane varieties, and *Allophylus Cobbe* and *Dodonæa* also reach into the mountain zone.

1. CARDIOSPERMUM, *L.*

Annual herbs; l. alternate, without stip., 2-ternate; fl. polygamo-diœcious, irregular, in small cymes; sep. 4, persistent, in pairs, outer much the smaller; pet. 4, 2 upper each with a large scale near the base, 2 lower distant, each with a smaller crested scale; disk unilateral, of 2 glands opp. lower pet.; stam. 8, excentric, fil. connate at base; ov. 3-celled, with 1 ascending ovule in each cell, style short, stigmas 3; fruit an inflated, 3-celled, 3-valved, membranous, loculicidal capsule; seed globose, with a small aril, cotyledons large, no endosperm.—Sp. 15; 2 in *Fl. B. Ind.*

L. glabrous; fl. $\frac{1}{6}$ in.; capsule depressed-pyriform 1. C. HALICACABUM.
L. pubescent; fl. over $\frac{1}{2}$ in.; caps. globular-ovoid. 2. C. CORINDUM.

1. **C. Halicacabum,*** *L. Sp. Pl.* 366 (1753). **Penela-wel,** *S.*
Herm. Mus. 5, 42. Burm. Thes. 75, 76. Fl. Zeyl. n. 142. Moon Cat. 32. Thw. Enum. 54. C. P. 2598.
Fl. B. Ind. i. 670. Wight, Ic. t. 508. Bot. Mag. t. 1049.

Annual, subscandent, stem slender, strongly furrowed, slightly branched, glabrous, young parts puberulous; l. biternate, petiole long, 2–3 in., spreading or deflexed, furrowed, lflts. sessile or shortly stalked, ovate, tapering at base, acute, deeply incised-serrate, glabrous, thin and flaccid; fl. very small, $\frac{1}{6}$ in., on slender ped. 3–7 in., a very small cyme terminating a stiff, slender, horizontal, axillary peduncle 4 in. long, and provided beneath the cyme with 2 opp. reflexed,

* *Halicacabum peregrinum* was the name for this in the early writers on plants, but the ἁλικάκαβον of the Greeks was probably a *Physalis*.

circinate or hooked tendrils; sep. rounded, the outer pair very small; pet. rounded, scarcely clawed, scales of upper ones emarginate; style very short; capsule on a short slender stalk, bladder-like, $\frac{1}{2}$–$\frac{3}{4}$ in. wide, depressed-pyriform, trigonous, truncate at top, winged at the angles, valves papery, veiny, finely pubescent; seeds $\frac{1}{6}$–$\frac{1}{4}$ in., globular, glabrous, black, the aril heart-shaped, white.

Low country in both moist and dry regions; very common. Often a weed in waste ground. Fl. all the year; white.

Throughout the Tropics of the world.

The form with smaller capsules (*C. microcarpum* H.B.K.) is equally common with the type, and was already distinguished by Hermann.

A plant collected on the shores of Kantalai Tank and in the Kottiyar District has very large, less angular, and more strongly pubescent capsules $1\frac{1}{4}$ in. wide, and the young leaves are very pubescent, but the very small flowers separate it from the next, which it otherwise much resembles. It requires further study.

2. **C. Corindum,*** *L. Sp. Pl. ed.* 2, 526 (1762).
C. canescens, Wall., Trim. in Journ. Bot. 1885, 144; Cat. Ceyl. Pl. 20. Fl. B. Ind. i. 670 (*C. canescens*). Wight, Ic. t. 74.

Annual, scandent, much-branched, stems deeply furrowed, minutely cottony-pubescent; l. bi-ternate, lflts. smaller than in the last, pubescent on both sides, densely so beneath, terminal ones very acuminate, cuspidate; fl. large, $\frac{3}{8}$ in. diam., numerous, in pyramidal, paniculate cymes, peduncles stiff, sparingly pubescent; scales of upper pet. as long as them, entire, those of lower pet. strongly crested; style larger, stigmas longer; capsule $1\frac{1}{4}$–$1\frac{3}{4}$ in., inflated, ovoid-globose, 3-angled, not winged. Otherwise as in *C. Halicacabum*.

Dry country; very rare (?). About Hambantota, abundant. Fl. December; white and yellow.

S. India, Burma, Trop. Africa, and America.

I have reduced *C. canescens*, Wall. to Linnæus' *C. Corindum* (originally based on S. American specimens), from which it does not appear to differ materially so far as descriptions go.

A very pretty climber, abundantly distinct from *C. Halicacabum*.

Dittelasma Rarak, Hk. f. There are a few trees of this near the Badulla road about Palagama, Uva, but they are probably introduced; the tree is native in Java and Malacca. The berry is used here for soap, and called 'Penela.' Thwaites distributed specimens 'from a native garden' under C. P. 3509.

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* Properly two words, *Cor indum;* another name used by the old botanists for this genus, and alluding, like *Cardiospermum*, to the heart-shaped aril of the seed.

2. **HEMIGYROSA**, *Bl.*

Trees; l. alternate, pinnate, without stip.; fl. polygamo-dioecious, irregular; sep. 5, unequal, imbricate, concave; pet. 4 (or with a smaller 5th), erect, imbricate, clawed, with a jagged hooded scale near the base; disk unilateral, cushion-shaped; stam. usually 8, unilateral on opp. side from disk, distinct; ov. excentric, 3-celled, with 1 ovule in each cell; fruit indehiscent, woody or cartilaginous, 1–3-seeded; cotyledons fleshy, no endosperm.—Sp. 4; 3 in *Fl. B. Ind.*

Radlkofer places this genus under *Lepisanthes*, Bl.

H. canescens, *Thw. Enum.* 56 (1858).
Sapindus tetraphylla, Vahl, Symb. iii. 54. Thw. Enum. 408. C. P. 3508. Fl. B. Ind. i. 671. Bedd. Fl. Sylv. t. 151.

A moderate-sized tree with whitish-grey bark, young parts pubescent; l. abruptly pinnate, petiole and rachis 2½–3½ in., stout, smooth, lflts. 2 pair, nearly opp., shortly stalked, 3–4½ in., lanceolate-oblong, acute at base, obtuse or emarginate, entire, glabrous, rather thick, ashy-green, venation reticulate, prominent; fl. numerous, on short, stout, tomentose ped., laxly fasciculate on the narrow branches of short (3–6 in.), floccose-pubescent panicles from the axils of fallen l., bracts minute, triangular, rather shorter than ped.; pet. usually 4, shortly clawed, slightly laciniate, hairy at base, scale about ½ as long, laciniate, woolly; stam. rather longer than pet., fil. hairy; fr. scarcely 1 in., oblong-ovoid, apiculate, finely tomentose, yellow, pericarp cartilaginous, not woody; seed usually solitary, oblong-ovoid, smooth, brown.

Var. β. **trichocarpa,** *Thw. Enum.* 56 (sp.). C. P. 607.

Lflts. 3–4 pair, larger, oval, acuminate, bright green, venation less prominent; fl. more crowded, in larger panicles, bracts subulate, much longer than ped.; fr. trigonous-globose, somewhat depressed, apiculate, very densely hairy, pericarp woody, hairy inside, greyish-green; seeds usually 3.

Low country; the type common in the dry region; var. β. in the moist region to 2000 ft.; rather rare. Frequent about Kandy. Fl. March–May; white.

Also in S. India and Burma.

Vahl's *S. tetraphylla* was collected by Koenig, but I have not seen his specimen.

Judging from Ceylon specimens only, I should feel inclined to retain specific rank for *H. trichocarpa*, Thw.; but, as in Fl. B. Ind. it is not even regarded as a variety, I suspect that there must be connecting links on

the mainland. Specimens from Mawerella, S. Prov. have very large lflts. and an abbreviated inflor.

H. deficiens, Bedd. Thwaites (l. c.) gives as var. β. of *H. trichocarpa* from Bintenne and Matale East a plant with more numerous (4–5 pair) and narrower very acuminate lflts. This I suspect to be *Sapindus deficiens*, Wight, Ill. i. 141 (from Ceylon), figured in Bedd. Fl. Sylv. t. 231, and kept up as a species in Fl. B. Ind. But our specimens are somewhat imperfect.

3. ALLOPHYLUS, *L.*

Shrubs or small trees; l. simple or ternate, without stip.; fl. small, polygamo-diœcious, slightly irregular, in spicate racemes; sep. 4, in pairs, imbricate, the outer smaller; pet. 4, clawed, usually with a large hairy scale near the base; disk rather one-sided, of 4 rounded glands opp. pet.; stam. 8, inserted inside disk, fil. distinct; ov. 2-lobed, 2-celled, with 1 ovule in each cell; fruit indehiscent, of 2 distinct carp., one often abortive, pericarp pulpy; seed with a short aril, cotyledons plicate, no endosperm.—Sp. 80; 2 in *Fl. B. Ind.*

L. simple.
  L. glabrous; inflor. longer than petiole . . . 1. A. ZEYLANICUS.
  L. hairy on veins; inflor. shorter than petiole . 2. A. HISPIDUS.
L. ternate . . . . 3. A. COBBE.

1. **A. zeylanicus,** *L. Sp. Pl.* 348 (1753). **Wal-kobbe,** *S.*
Fl. Zeyl. n. 140. *Ornitrophe allophylus*, Pers., Moon Cat. 31. *Schmidelia allophylla*, DC., Thw. Enum. 55. C. P. 2679.
Fl. B. Ind. i. 673. Bedd. Ic. t. 286.

A small tree or shrub, with smooth, whitish bark, young parts glabrous; l. simple, 5–9 in., lanceolate, acute at base, more or less acuminate, acute, entire or with a few very coarse teeth in upper part, glabrous, petiole ½–¾ in.; racemes short, ¾–1½ in., hispid, fl. on very short ped., crowded; pet. slightly longer than sep., spathulate, hairy, scale very hairy; ripe carp. divaricate (one often abortive), each about ½ in., ovoid, smooth, red; seed ovoid, pointed at one end, smooth, white.

Var. β. **acuminatus,** *Hiern. Schmidelia acuminata*, Thw. Enum. 55. Bedd. Ic. t. 287. C. P. 3001.

L. much smaller, 3–4 in., oval, suddenly caudate-acuminate, obtuse; fl. on longer ped., in lax, nearly glabrous racemes.

Var. γ. **varians,** *Hiern. S. varians*, Thw. Enum. 408. Bedd. Ic. t. 288. C. P. 562.

L. small, 2–4 in., variable from oval to linear-lanceolate, usually rather obovate, repand-dentate in upper part, veins prominent beneath; racemes lax, pubescent; fl. rather larger.

Moist region; the type in the low country rather common; var. β. Galle, Galagama, abundant by streams; var. γ. montane zone up to 6000 ft., common. Fl. March–May, Sept., Oct.; greenish white.

Also in Sikkim and Assam, but under different varieties to the above, which are all endemic.

A very variable plant. The Fl. B. Ind. has another Ceylon variety, var. *Thwaitesii*, Hiern, which seems scarcely distinguishable from the type.

Wood yellowish-brown, even-grained, rather soft.

2. **A. hispidus,** *Trim. Syst. Cat. Pl. Ceyl.* 20 (1885).
Schmidelia hispida, Thw. Enum. 55. C. P. 3294.
Fl. B. Ind. i. 673 (under *A. zeylanicus*). Bedd. Fl. Sylv. t. 152.

A small tree, branchlets hispid, with spreading hairs; l. 5–14 in., oval or oblong, acute or rounded at base, acuminate, acute, shallowly and coarsely serrate in upper part, coarsely hairy on the veins and margin, becoming glabrous, petiole ½–1½ in., very hispid with spreading hairs; fl. ¼ in., on very short ped., densely crowded in very short, capitulate, axillary racemes shorter than the petioles; pet. with very villous scales; styles exserted; ripe carp. as in *A. zeylanicus*.

Moist low country; rare. Ambagamuwa; Singhe Raja Forest. Fl. March; greenish-white.

Endemic.

Seems too distinct a plant to be placed under *A. zeylanicus*, as is done in Fl. B. Ind.

3. **A. Cobbe,** *Bl. Rumph.* iii. 131 (1837). **Kobbé, Bu-kobbé,** *S.* **Amarai,** *T.*
Herm. Mus. 24. Burm. Thes. 101. Fl. Zeyl. n. 441. *Rhus Cobbe*, L. Sp. Pl. 267. *Toxicodendron Kobbe*, Gaertn. Fruct. i. 207. *Ornitrophe Cobbe*, W. and *O. serrata*, Roxb., Moon Cat. 31. *Schmidelia Cobbe*, DC., Thw. Enum. 55. C. P. 1156.
Fl. B. Ind. i. 671. Wight, Ic. t. 964, 2 (*Schmidelia*).

A tall, much-branched shrub or small tree, branches pubescent, young parts densely so; l. 3-foliolate, spreading, petioles 3–4 in., cylindrical, very pubescent, lflts. on short stalks, the central the longer, 4–6 in., oval, rounded at base, the terminal one acute at base, all slightly acuminate, acute, faintly serrate, softly pubescent on both sides, paler beneath, with tufts of hair in the vein-axils; fl. very small, on very short ped., in small fascicles on the slender branches of spicate, axillary panicles shorter than l.; sep. glabrous; pet. cuneate, scale half as long, hairy; ov. didymous, finely hairy; style twice as long as ov., stigmas recurved; ripe carp. usually solitary (one abortive), ¼ in., globular-ovoid, smooth, red.

Var. β. **villosus,** *Hiern.* *Schmedelia villosa*, Wight, Thw. Enum. 55. Wight, Ic. t. 401 and 964 (*S. Rheedii*). C. P. 3549.

L. densely and softly velvety, with yellowish pubescence.

The type in the low country, principally in the moist region; very common. Var. β. also extending into the lower montane zone. Fl. October; greenish.

Also in S. India, Malaya, and Trop. Australia.

Not very variable in Ceylon. The leaves are sometimes nearly glabrous above.

The Veddas employ the wood of this for making bows, as I am informed by Mr. Nevill. The little pulpy fruit is eaten. The leaves, bark, and root are accounted medicinal.

4. **SCHLEICHERA,** *Willd.*

Trees; l. pinnate; fl. small, polygamo-diœcious; cal. 4–6-fid; pet. 0; disk flat, crenate at margin; stam. 5–8, inserted within the disk; ov. 3-celled, with 1 erect ovule in each cell, stigma 3-lobed; fruit dry, indehiscent, 1–2-seeded; seed with a fleshy aril, embryo strongly curved, cotyledons connate, unequal.—Sp. 2; 1 in *Fl. B. Ind.*

S. trijuga, *Willd. Sp. Pl.* iv. 1096 (1805). **Kon,** *S.* **Puvu, Kula,** *T.*

Herm. Hort. Lugd.-Bat. 536. Herm. Mus. 69. Burm. Thes. 109. Fl. Zeyl. n. 603. *Koon*, Gaertn. Fruct. ii. 486. Moon Cat. 74. Thw. Enum. 58. C. P. 1155.

Fl. B. Ind. i. 681. Bedd. Fl. Sylv. t. 119 (not good). Brandis, For. Fl. t. 20. Gaertn. Fruct. ii. t. 180, f. 11 (fruit only).

A large tree, with rather smooth grey bark and spreading branches, buds pubescent; l. abruptly pinnate, petiole and rachis 3–7 in., hard, cylindrical, pubescent, much swollen at base, lflts. 3 or 4 pair, opp. or nearly so, on very short swollen stalks articulated with rachis, oblong or obovate-oblong, tapering or rounded often unequal at base, very obtuse, entire, much undulated, glabrous, shining above, paler beneath, with lat. veins prominent, rather stiff, the lowest ones smallest; fl. pedicellate, in lax, slightly branched, spicate panicles, 2–6 in., from the young shoots below the new leaves; cal.-segm. acute; stam. usually 7; ov. hairy, style long, stigma capitate; fr. under 1 in., ovoid, sharply pointed, smooth; seed roundish-ovoid, aril pulpy, nearly covering the seed.

Low country up to about 2000 ft.; common. Fl. March; green.

Throughout Peninsular India, also in Burma, Java, and Timor.

The 'Ceylon Oak' of the English, the foliage in the mass, especially when young, very much resembling that of *Quercus Robur*.

The fruit sometimes bears sharp spines on its sides.

There are no specimens in Hermann's Herb., and Linnæus names the

'Conghas' *Sapindus trifoliatus* in Sp. Pl. 367, but it is without doubt *Schleichera.*

Koenig states (in Hb. Banks) that the seeds excite vomiting; the pulpy aril is, however, eaten. An oil is obtained from the seeds. Wood very hard, heavy, close-grained, pale reddish brown, strong and durable.

5. **GLENIEA*** [by error *Glenniea*], *Hk. f.*

A tree; l. pinnate; fl. small, polygamo-diœcious; cal. 5-lobed, valvate; pet. 5, minute, deciduous; disk wide, flat, lobed at margin; stam. 8 (or 10), inserted within the disk; ov. 3-celled, with 1 ovule in each cell, style very short, thick; fruit hard-fleshy, indehiscent, 1–3-seeded; seed globose, without an aril.—Monotypic.

G. zeylanica, *Hk. f. in Thw. Enum.* 408 (1864). **Wal-mora,** *S.* **Kuma,** *T.* [PLATE XXV.]

Nephelium fuscatum, Thw. Enum. 58. *Sapindus Gleniei,* Thw. Enum. 408. C. P. 2577, 3676.

Fl. B. Ind. i. 682. Bedd. Fl. Sylv. t. 153.

A moderate-sized tree, with thin whitish bark; l. pinnate, rachis 1–2 in., stiff, smooth, much swollen at base, lflts. 2 or 4 (1 or 2 pair), opp. or alternate, very shortly stalked, 2½–4 in., oval or lanceolate-oblong, acute at base, very obtuse, entire, undulate, quite glabrous, rather thick, stiff, venation reticulate, prominent; fl. shortly pedicellate, in little clusters on the sides of spicate, minutely pilose inflor., which is in the male tree terminal, paniculate and much exceeding l., and in the bisexual mostly axillary, simple and shorter than l.; cal.-lobes acute, pubescent; pet. hairy, easily overlooked; stam. in male fl. spreading, exceeding cal., in bisexual fl. short; ov. hairy; fr. 1–1½ in., depressed-globose, 2- or 3-lobed, smooth, green; seed ½ in., globose, smooth, cinnamon-brown.

Var. *β.* **unijuga,** *Trim.* *Sapindus unijugus,* Thw. Enum. 56. C. P. 2465.

Lflts. 2, opposite, rather larger and narrower.

Forests of the dry region; common. Var. *β.* much less common, and passing into the moist region at Deltota and Matale. Fl. Sept.–Dec.; greenish-white.

Endemic.

Wood yellowish-white, rather heavy, smooth, fine-grained.

This is nearly diœcious, and the inflorescence of the male and fruit-

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* Named in commemoration of Rev. S. O. Glenie, Colonial Chaplain and Archdeacon of Ceylon, F.L.S. He resided at Trincomalie from 1859 to 1871, where he made large collections and sent them to Thwaites for determination and incorporation in the 'Enumeratio.' Died 1875.

bearing trees are conspicuously different. Thwaites' *N. fuscatum* was described from male fl. only, and his *S. unijugus* from bisexual ones.

6. SAPINDUS, *L.*

Trees or shrubs; l. pinnate, rarely simple; fl. polygamous, in terminal or axillary panicles; sep. 5, much imbricate; pet. 5, with or without a scale within; disk annular, fleshy, usually lobed; stam. 8 or 7, inserted within the disk; ov. 2- or 3-celled, with 1 erect ovule in each cell, 2- or 3-lobed, stigma small, lobed; fruit of 1–3 nearly distinct, indehiscent, fleshy cocci; seed large, with or without an aril, testa hard or membranous, cotyledons thick. — Sp. about 40; 7 in *Fl. B. Ind.*

This genus requires division into several.

Pet. without a scale.
  Lflts. 4–6.
    Lflts. shortly acuminate . . . . . . 1. S. LAURIFOLIUS.
    Lflts. rounded, emarginate . . . . . 2. S. EMARGINATUS.
Pet. with a scale.
  Lflts. 2 . . . . 3. S. BIFOLIATUS.
  Lflts. 8–14 . . . . 4. S. ERECTUS.
  Leaves simple . . . . 5. S. THWAITESII.

1. **S. laurifolius,** *Vahl, Symb.* iii. 54 (1794). **Kaha-penela,** *S.* Moon Cat. 32. Thw. Enum. 55. C. P. 2545.
Fl. B. Ind. i. 682 (*S. trifoliatus*). Rheede, Hort. Mal. iv. t. 19.

A tree, young parts pubescent; l. pinnate, long-stalked, rachis 6–10 in., rigid, pubescent, lflts. 4–6, on very short, thick, pubescent stalks, sub-opposite, 5–7 in., lanceolate or oval-lanceolate, acute at base, shortly acuminate, obtuse, entire, glabrous above, softly and shortly hairy beneath; fl. small, numerous, on short ped., in an erect, much-branched, dense, pyramidal, terminal, more or less pubescent panicle; sep. silky, obtuse, 2 outer much smaller; pet. linear-oblong, erect, longer than sep.; stam. 8, fil. hairy throughout; ov. very hairy; ripe fr. not seen.

Moist low country; rather common. Panadura (Moon). Fl. July, November; white, slightly sweet-scented.

Also in Southern India.

Hiern, in Fl. Brit. Ind., gives the name *S. trifoliatus*, L. to this and the next combined. The name is an absurd one, as neither plant is trifoliate. Moreover, the plant so called by Linnæus is the 'Conghas' of Hermann, which, as already noticed, is *Schleichera trijuga*. Linnæus afterwards added a quotation of Rheede's figure, and hence his name has got transferred to the present species; but it should not be maintained.

The Fl. B. Ind. describes a scale to the petals, which I have never seen either in this or *S. emarginatus*.

2. **S. emarginatus,** *Vahl, Symb.* iii. 54 (1794). **Penela,** *S.* **Neykkoddan, Panalai,** *T.*
Moon Cat. 32. Thw. Enum. 55. C. P. 1151.
Fl. B. Ind. i. 682 (*S. trifoliatus*). Wight, Ill. t. 51. Bedd. Fl. Sylv. t. 154.

A large tree, with rough whitish bark and much-branched spreading head, young parts glabrous; l. pinnate, rachis 2–4 in., glabrous, lflts. 4–6, opposite or sub-opposite, $2\frac{1}{2}$–4 in., broad-oval or oval-oblong, acute or rounded at base, rounded and not at all acuminate at apex, emarginate, glabrous above, glabrous or densely pubescent beneath, very stiff, convex above, greyish-green, with very prominent veins; fl. very shortly stalked, in large, much-branched, spreading, terminal panicles; sep. erect, obtuse; pet. erect, longer than sep., oblong-linear, very silky, with white down especially on margins and with a dense tuft in centre but no scale; disk 5-lobed; stam. 8, as long as pet. (in male fl.), fil. hairy below; fr. of 1 (rarely 2 or 3) nearly globular carp., $\frac{1}{2}$ in., pericarp thick, fleshy; seed globular, with a hard thick testa, black.

Forests of the dry region; common. Fl. March; greenish-white.
Common throughout India and in Burma.
The fruit is the 'soap-nut' of Europeans, and is much used by the natives for soap. Wood hard, heavy, yellow.
Much resembles *Hemigyrosa canescens* in foliage.

3. **S. bifoliatus,** *Hiern in Fl. B. Ind.* i. 684 (1875).
Nephelium bifoliatum, Thw. Enum. 57. C. P. 1721.
Fl. B. Ind. i. 684. Bedd. Ic. t. 289.

A moderate-sized tree, young parts pubescent; l. compound, rachis $\frac{3}{4}$ in., glabrous, lflts. 2, opp., on short swollen stalks, 3–4 in., narrow-lanceolate, acute at base, obtuse, entire, undulate, glabrous; fl. $\frac{1}{4}$ in., numerous, very shortly pedicellate, in small clusters on the branches of open, spreading, terminal and axillary panicles; sep. rounded, ciliate; pet. about as long as sep., broad-oblong, obtuse, strongly ciliate, with a short ciliate scale at base; stam. usually 7; ov. didymous, 2-celled, style as long as ov.; ripe fr. not seen, usually of 1 carp., ovoid, glabrous.

Dry region; rather rare. Trincomalie; Uma-oya; Dambulla; Kalawewa. Fl. Feb.–April; white.
Also in S. India.
This is placed under the genus *Aphania*, Bl. by Radlkofer. Handsome when in flower, from the large masses of blossom. Resembles *Gleniea zeylanica*, var. *unijuga*, in its foliage.

4. **S. erectus,** *Hiern in Fl. B. Ind.* i. 683 (1875).
Nephelium erectum, Thw. Enum. 57. C. P. 1150.
Fl. B. Ind. i. 683.

A shrub, 8–10 ft. high, scarcely branched; l. large, pinnate, rachis 12–16 in., stiff, glabrous, lflts. 8–14, opp. or sub-opp., on short swollen stalks, 4–10 in., oblong-lanceolate, acute at base, shortly acuminate, acute, entire, glabrous, rather thin, reticulate; fl. $\frac{1}{4}$ in., on short stout ped., in elongated, slightly branched, terminal panicles; cal.-segm. concave, obtuse, very pubescent; pet. spathulate-oval, broadly clawed, with a bifid hairy scale; disk annular; ov. hairy, style very short; fr. of 1 (rarely 2 or 3) ripe carp., ovoid, about 1 in., finely tomentose, yellow, pericarp leathery; seed entirely enveloped in white fleshy aril, testa brown, cotyledons thick, unequal.

Moist low country up to 3000 ft.; rather rare. Hantane; Hewahette; Kurunegala. Fl. April–June; greenish-white.
Endemic.
This and the following form the genus *Thraulococcus*, Radlk.

5. **S. Thwaitesii,** *Hiern in Fl. B. Ind.* i. 683 (1875).
Nephelium simplicifolium, Thw. Enum. 57. C. P. 443.
Fl. B. Ind. i. 683.

An erect shrub, 6–10 ft. high, slightly branched; l. simple, large, 8–14 in., narrow-lanceolate, acute at base, tapering into petiole, caudate-acuminate, subacute, entire, glabrous, thin, reticulate, petiole 1 in.; fl. on short ped., in small, narrow, erect, finely pubescent, terminal or axillary panicles 2–3 in. long; cal.-segm. rounded; pet. rounded, not clawed, ciliate, with a small villous scale at base; ripe fr. not seen, apparently quite similar to *S. erectus*.

Moist low country, lower zone; very rare. Reigam Korale (Thwaites); Deyandera, S. Prov. Fl. Sept.; greenish-white.
Endemic.

7. NEPHELIUM,* *L.*

Trees; l. pinnate; fl. polygamous, in terminal panicles; cal. deeply 5-fid, valvate, persistent; pet. 5, narrow, without scales; disk annular, fleshy, lobed; stam. in male fl. 10, in bisexual fl. 5 or 8; ov. 2-celled, with 1 erect ovule in each cell, tuberculate; fruit of 2 (or 1 by abortion) indehiscent, nearly distinct cocci; seed surrounded by pulpy aril, cotyledons plane-convex.—Sp. 30; 12 in *Fl. B. Ind.*

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* Refers to the bur-like fruit of the original species, the Rambutan *N. lappaceum*).

Leaflets entire . . . . 1. N. LONGANA.
Leaflets dentate-serrate . . . . 2. N. GARDNERI.

1. **N. Longana,*** *Camb. in Mém. Mus. Par.* xviii. 30 (1829). **Mora, Rasamora,** *S.* **Nurai,** *T.*

More, Gaertn. Fruct. ii. 487. *Dimocarpus pupilla*, Moon Cat. 31. *Nephelium pupillum*, Wight, Ill. i. 141. Thw. Enum. 58. *Euphoria Longana*, Lam., Thw. Enum. 408. C. P. 1152.

Fl. B. Ind. i. 688. Gaertn. Fruct. t. 180, f. 5. Bedd. Fl. Sylv. t. 156.

A large tree, with much-branched head, bark smooth, yellowish-grey, flaking off in small pieces, young parts with fine rufous stellate pubescence; l. pinnate, rachis 4–6 in., cylindrical, rough, with fine stellate puberulence, lflts. on very short tumid stalks, 7–11, oblong-lanceolate, acute and unequal at base, shortly acuminate, sub-obtuse, entire, rather undulate, glabrous, dark green and shining above, pale dull green, often puberulous and minutely reticulate beneath, drying brown; fl. on pubescent ped., in clusters on branches of large, lax, pyramidal, pubescent, terminal panicles; cal. densely pubescent, lobes obtuse; pet. about as long as cal., linear-spathulate; fil. and disk hairy; ov. didymous, very hairy, style long, stigmas 2, recurved; fr. supported on persistent cal., of 2, or usually 1 by abortion, divaricate carp., $\frac{1}{2}$–$\frac{5}{8}$ in., globular-ovoid, faintly tuberculated, with stellate hair on the tubercles when young afterwards glabrous, pericarp thin, brittle; seed completely covered with thin pulpy aril, black, shining.

Var. β. **pallida,** *Trim.*

Lflts. fewer, 3–7, broader, quite glabrous beneath, drying a pale yellowish-green (not brown); fl. larger; cal.-segm. very obtuse, less hairy; pet. very hairy; fr. not seen.

Low country in dry and moist regions to 2000 ft.; common. Var. β. on Dambulla Hill. Fl. April–July; pale yellow.

Also in S. India, E. Bengal, Burma, and S. China.

Wood moderately hard and heavy, pale brownish-red. The aril of the seed is edible and very sweet, but is inferior to that of the Litchi or the Rambutan. It a good deal resembles that of *Walsura Piscidia*. The tree is not cultivated in Ceylon.

2. **N. Gardneri,** *Thw. Enum.* 58 (1858). **Nurai,** *T.*

Euphoria Gardneri, Thw. Enum. 408. C. P. 1154.

Fl. B. Ind. i. 690. Bedd. Ic. t. 285 (*Euphoria*).

A tree, with pale bark, young parts pubescent; l. pinnate, rachis $2\frac{1}{2}$–$3\frac{1}{2}$ in., glabrous, lflts. usually 6, opp. or sub-opp., shortly stalked, lanceolate, acute and oblique at base, slightly

* 'Long-yen' is the name of the fruit in China.

acuminate, obtuse, very coarsely dentate-serrate, glabrous, rather thick, pale beneath, drying pale yellowish-green; fl. as in *N. Longana;* cal.-segm. acute; pet. longer than cal., very hairy, linear; fr. as in the last but more tuberculated.

Dry or desert region; very rare. Puttalam (Gardner, Ferguson); Northern Province (Vincent).
Endemic.

8. POMETIA, *Forst.*

Trees; l. pinnate; fl. polygamous, in large terminal panicles; cal. 5-fid, valvate; pet. 5, very short, without a scale; disk annular, fleshy; stam. 5, inserted within the disk; ov. 2-lobed, 2-celled, with 1 erect ovule in each cell, stigma bilobed; fruit a solitary, indehiscent coccus; seed enclosed in a pulpy aril.—Sp. 5; 1 in *Fl. B. Ind.*

P. eximia, *Hk. f. in Thw. Enum.* 408 (1864). **Gal-mora, Bulu-mora,** *S.*
Eccremanthus eximius, Thw. in Kew Journ. Bot. vii. 272. *Nephelium eximium*, Thw. Enum 57. C. P. 1153.
Fl. B. Ind. i. 691 (*P. tomentosa*). Kew Journ. Bot. vii. t. 9. Bedd. Fl. Sylv. t. 157.

A very large tree, with a straight erect trunk and large spreading head, bark yellowish or pinkish, smooth, thin, flaking off in small pieces, young parts covered with short fulvous hair; l. very large, pinnate, rachis 10–15 in., densely fulvous-hairy, lflts. 6–10 pair, opp. or nearly so, on short, thick, hairy stalks, lanceolate-oblong, rounded or subcordate and unequal at base, acuminate, acute, shallowly and distantly dentate-serrate, glabrous, except on midrib, above, hairy on veins beneath, with the lat. veins parallel and prominent beneath, unequal, the middle one the largest, the basal pair very small, stipuliform, soon deciduous; fl. small, very numerous, on long slender ped., in little stalked, unilateral cymes closely arranged on the slender, elongated branches of a very large, much-branched, pubescent, pendulous, terminal panicle; cal.-segm. triangular, hairy; pet. shorter than cal., very small, not clawed, broader than long, truncate; fil. (in male fl.) long, slightly hairy; ov. rather hairy; fr. of 1 coccus (by abortion), 1–1¼ in., oblong-ovoid, smooth, crimson, pericarp fleshy-leathery, rather thick; seed covered with a soft mucilaginous aril, testa brown.

Upper zone of moist low country; rather rare. Kadaganuwa; Deltota; Watagoda; about Kandy, &c.; Forests of Kuruwita Korale, abundant.
Fl. May, June; yellowish-brown, pet. greenish.

Also in Andaman Is., Malacca, and Malay Archipelago, and perhaps not distinct from *P. pinnata*, Forst. of the Pacific Islands.

A very handsome tree, much planted for shade. Grows to a gigantic size in the wet forests. Wood pale yellowish-red, rather light, with large pores.

Kurz's name, adopted in Fl. B. India, is several years later than that here given.

9. **HARPULLIA,*** *Roxb.*

Trees; l. pinnate; fl. large, polygamo-diœcious; sep. 5, distinct, much imbricate; pet. 5, with long claws, imbricate; disk small, 5-lobed; stam. 5, inserted on the disk; ov. 2-celled, with 2 superposed ovules in each cell, style very long, stigma long, spirally twisted; fruit an inflated, 2-celled, dry, loculicidal capsule, with 1 or 2 seeds in each cell; seed with a small cup-shaped aril at base, cotyledons large, thick.—Sp. 6; 1 in *Fl. B. Ind.*

H. imbricata, *Thw. Enum.* 56 (1858). **Na-imbul, Pundalu,** *S.*

Streptostigma viridiflorum, Thw. in Kew Journ. Bot. vi. 298. C. P. 605.

Fl. B. Ind. i. 692 (*H. cupanioides*). Kew Journ. Bot. vi. t. 9 A. Bedd. Fl. Sylv. t. 158.

A large tree, with an erect straight trunk and pale smooth bark, young parts finely fulvous-pubescent; l. pinnate, rachis 6–10 in., cylindrical, pubescent, lflts. 8–10, opp. or alt., on short thick stalks, articulated, 3–6 in., lanceolate, acute and unequal at base, acuminate, obtuse, entire, glabrous and shining, bright light green, thin, with veins conspicuous beneath, upper ones largest; fl. large, $\frac{5}{8}$ in., on long puberulous ped. on very lax, drooping or pendulous, axillary panicles 2–12 in. long, bracts linear-lanceolate, leafy, shorter than ped.; sep. broadly oblong-oval, very obtuse, pubescent; pet. erect, $\frac{5}{8}$ in., recurved at top, veined, claw long, blade oblong-spathulate, obtuse, cordate and inflexed at base; stam. in male fl. exceeding pet., in bisexual fl. much shorter, anth. versatile; ov. compressed, densely pubescent, tapering, style 3 or 4 times as long, stigma exserted, long, spirally twisted; capsule pendulous, inflated, didymous, 1 in. long, $1\frac{1}{2}$–$1\frac{3}{4}$ in. wide, somewhat compressed, tipped with persistent style, pubescent, becoming glabrous, bright orange, pericarp chartaceous; seed

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* From the Bengali name used in Chittagong.

about ½ in., oblong-ovoid, smooth and shining, jet black, aril very small, orange, embryo green.

Moist low country up to 3000 ft.; rather common. Hantane; Kaduganawa; Hangurankette; Haldummulla; Haputale. Fl. April–July, November; pale greenish or sulphur-yellow.

Also in S.W. India and Malay Archipelago.

A very ornamental tree both in flower and fruit.

The fruit is used for washing purposes, and, like other Sapindaceæ so used, often called 'Penela.' The name 'Na-imbul' is sometimes applied to *Pometia.*

Our plant is certainly *Otonychium imbricatum*, Bl. of Java and Sumatra, and differs from *H. cupanioides*, Roxb. of Burma, to which it is referred in Fl. B. Ind., in its deciduous calyx, spirally twisted style, and very small aril. The tree of S.W. India is the same as ours.

10. **DODONÆA**, *L.*

Shrubs or small trees; l. simple, alt.; fl. polygamous or diœcious, in axillary panicles; sep. 5, distinct; pet. 0; stam. generally 8, fil. very short, inserted outside disk; disk very small; ov. 3-celled, with 2 ovules in each cell; fruit a trigonous winged capsule; seed without an aril, embryo spiral, no endosperm.—Sp. about 40; 1 in *Fl. B. Ind.*

D. viscosa, *L. Mant.* ii. 149 (1771). **Eta-werella,** *S.* **Virali,** *T.*

Herm. Mus. 32. Burm. Thes. 55. Fl. Zeyl. n. 141. Moon Cat. 31. *D. Burmanniana*, DC., Thw. Enum. 59. C. P. 1158.

Fl. B. Ind. i. 697. Burm. Thes. t. 23. Wight, Ill. t. 52.

A shrub or small tree, with numerous erect, twiggy branches, bark longitudinally cracked and striate, young parts scurfy-puberulous; l. simple, nearly sessile, 2–3½ in., linear-lanceolate, very tapering at base, subacute or obtuse, entire, margin often slightly revolute, glabrous, more or less viscid with a shining resinous exudation; fl. small, on long slender ped., nodding, in lax axillary panicles shorter than l.; sep. ovate, acute, glabrous; anth. oblong-linear, very large; ov. pilose, style very long, conspicuous; capsule over ½ in., trigonous, the angles with a broad, membranous, veined, rounded wing, glabrous, viscid with resin, orange-brown; seed black.

Open waste ground in the low country and ascending to 4000 ft.; rather rare or local, but where it occurs growing gregariously in great abundance, as in Uva beyond Wilson's Bungalow, the Teak Plantation near Matara, &c. Fl. Jan.–April; yellowish.

In all Tropical countries.

11. TURPINIA,* *Vent.*

Trees; l. opp., with interpetiolar stip.; fl. bisexual, in panicles; cal. deeply 5-lobed, imbricate; pet. 5, imbricate; stam. 5, inserted outside disk and slightly connate with it; disk cup-shaped, lobed; ov. 2- or 3-celled, with 2 or more ovules in each cell, style short, stigma sub-capitate; fruit fleshy, indehiscent, 2- or 3-celled, several-seeded; seed angular, without an aril, embryo straight, in fleshy endosperm.—Sp. 8; 1 in *Fl. B. Ind.*

T. pomifera, *DC. Prod.* ii. 3 (1825). **Eta-hirilla, Kankumbala,** *S.*
T. nepalensis, Wall., Thw. Enum. 71. C. P. 218.
Fl. B. Ind. i. 698. Wight, Ic. t. 992. Bedd. Fl. Sylv. t. 159.

A large or small tree, young parts glabrous; l. opp., imparipinnate, rachis 2–6 in., striate, glabrous, lflts. 3–9 (1–4 pair and a terminal one), opp., on short furrowed stalks, 3–4½ in., tapering at base, strongly acuminate, obtuse, finely serrate, glabrous and shining, stip. triangular, early deciduous; fl. numerous, on glabrous ped., in lax, axillary and terminal panicles shorter than l., cal.-lobes finely ciliate, obtuse; pet. erect, oblong-oval, obtuse, finely ciliate, as long as sep.; stam. shorter than pet.; fr. nearly globose, ½–1 in., smooth, purplish-black, pericarp hard-fleshy; seeds angular, shining, dark brown.

Var. β. **montana,** *Thw. l. c.*

Lflts. thick, coriaceous, margins often revolute; fl. fewer, more crowded, larger.

Moist low country; common. Var. β. in the upper montane zone; common. Fl. March, October; white.

Also in S. India, E. Bengal, Malay Peninsula, and China.

The young foliage of var. β. is brilliantly coloured pink- or scarlet-orange, and very ornamental to the hill forests.

I am uncertain as to the true Siṇhalese name of this common tree; those above given are doubtful.

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* Commemorates the French botanist and artist P. J. F. Turpin; died 1840.

XLI.—SABIACEÆ.

TREES; l. alternate, simple or pinnate, without stip.; fl. bisexual, irregular, small, in panicles; sep. distinct, surrounded by several persistent bractlets indistinguishable from them, in all 5–13; pet. 5, distinct, unequal, 3 larger valvate or imbricate, orbicular, concave, 2 much smaller, bifid; stam. 5, distinct, only 2 fertile, opp. and adnate to the smaller pet., fil. dilated at top, anth.-cells globose, the other 3 reduced to barren, scale-like staminodes, opp. and adnate to base of larger pet.; disk small, annular, toothed; ov. 2-celled, with 2 superposed ovules in each cell, style short, conical; fruit an oblique drupe, stone 1-celled, 1-seeded; seed globose, no endosperm.

Two of our three species are montane, the other inhabits the moist low country.

MELIOSMA, *Bl.*

For characters, see Order.—Sp. 20; 11 in *Fl. B. Ind.*

L. simple.
Bractlets and sep. about 13 . . . . . 1. M. WIGHTII.
Bractlets and sep. about 5 . . . . . 2. M. SIMPLICIFOLIA.
L. pinnate . . . . 3. M. ARNOTTIANA.

1. **M. Wightii,** *Planch. in Fl. B. Ind.* ii. 4 (1876).
M. pungens, Thw. Enum. 59 (non Walp.). C. P. 300.
Fl. B. Ind. ii. 4. Wight, Ic. t. 964, 3 (*Millingtonia pungens*).

A small tree, young shoots shortly woolly-pubescent; l. simple, 4–7 in., lanceolate or oblong-oval, acute at base, slightly attenuate, acute, entire or with a few sharp, shallow, distant serrations in upper part, glabrous above except on veins, slightly pubescent beneath, stiff, harsh, veins prominent and reddish beneath, often with tufts of hair in axils, petiole ½–1 in., woolly-pubescent; fl. small, nearly sessile, in clusters on the short branches of narrowly pyramidal, erect (drooping in bud), rufous-hairy, terminal panicles; bractlets and sep. about 13, broad, obtuse, ciliate, the outer ones pubescent; large pet. rounded, obtuse, with the margin involute, small ones bifid; staminodes scale-like, various in form; ov. flask-shaped, glabrous; drupe supported on persistent sep., ¼ in., nearly globular.

Upper montane zone; common. Fl. April, September; pale yellow. Also in Southern Indian Hills.

Scarcely differs from *M. pungens*, Wall. of the Himalaya, to which Wight referred it.

2. **M. simplicifolia,** *Walp. Rep.* i. 423 (1842). **Elbedda,** *S.*
Thw. Enum. 59. C. P. 703.
Fl. B. Ind. ii. 5. Roxb. Cor. Pl. t. 254 (*Millingtonia*).

A moderate-sized tree, bark white, smooth, marked with large leaf-scars on the younger branches, young parts rufous-pubescent; l. 5–12 in., simple, obovate- or oblong-lanceolate, much tapering at base, obtuse or shortly acuminate and acute, entire, thin, glabrous above, slightly pubescent beneath on the veins and with tufts of hair in their axils, lat. veins parallel, prominent beneath, petiole $\frac{1}{2}$–$\frac{3}{4}$ in., much swollen at base, nearly glabrous; fl. very small, nearly sessile, laxly arranged in large, spreading, pubescent, pyramidal, axillary and terminal panicles; bractlets and sep. about 5 or 6, outer ones setaceous, hairy, inner ones broad, acute; large pet. rotund-oval, obtuse, small ones bifid with filiform segm.; drupe $\frac{1}{4}$ in., nearly globular, shining, purple.

Upper zone of moist low country; very common. Fl. Jan.; yellowish-white.
Also in S. India, E. Bengal, and Burma.
Wood pale reddish, moderately hard, rather light, splits readily.

3. **M. Arnottiana,** *Walp. Rep.* i. 423 (1842).
Millingtonia Arnottiana, Wight, Ill. i. 144. Thw. Enum. 59. C. P. 293.
Fl. B. Ind. ii. 6. Wight, Ill. t. 53. Bedd. Fl. Sylv. t. 160.

A moderate-sized tree. young parts with rusty, deciduous hair; l. imparipinnate, rachis 4–7 in., pubescent or tomentose, lflts. 9–15, opp. or nearly so, on short tomentose stalks, 2–3$\frac{1}{2}$ in., lanceolate or ovate-lanceolate, often somewhat falcate, acute or rounded at base, usually caudate-acuminate, acute, entire, glabrous except on midrib above, more or less rusty-tomentose beneath; fl. small, very nearly sessile, crowded on the branches of copious, pyramidal, rufous-tomentose, axillary and terminal panicles; bractlets and sep. about 5, orbicular, very obtuse, ciliate; large pet. orbicular, small ones minute, deeply bifid; drupe about $\frac{1}{4}$ in., ovoid-globular, usually with the remains of the persistent style near the base.

Montane zone, above 4000 ft.; common. Fl. April; yellowish-white.
Also in the mountains of S. India.
A great ornament to the montane forests when covered with its sheets of cream-coloured blossoms. The tree is bare of leaves for a short time in January.
The wood is called 'Nika-dawulu' at N. Eliya; it is light, spongy, and of no value.

XLII.—ANACARDIACEÆ.

TREES, rarely shrubs; l. alt., simple or compound, without stip.; fl. small, unisexual, often diœcious, rarely bisexual; cal. 3–5-fid, or of 5 distinct sep.; pet. 5, 4, rarely 3, imbricate, rarely valvate; stam. 4–10, inserted inside or outside or on the disk; disk conspicuous, annular, often lobed; ov. 1-celled (rarely 5-celled), with a solitary pendulous ovule (in *Buchanania* of 5 distinct carp.); fruit a drupe, with a 1- (rarely 5-) celled, 1-seeded stone; seed without endosperm, embryo large, with plane-convex or flat cotyledons.

Carp. 5 distinct, only 1 fertile; stam. 10 . . .	1. BUCHANANIA.
Carp. combined into a 1-celled ovary; stam. 4–8.	
Stam. 5–8, only 1 fertile; pet. 5; style 1 . . .	2. MANGIFERA.
Stam. 8; pet. 4; styles 4	3. ODINA.
Stam. and pet. 5; styles 3	4. SEMECARPUS.
Stam. and pet. 4; style 1	5. NOTHOPEGIA.
Stam. 6; pet. 3; style 1	6. CAMPNOSPERMA.
Carp. combined into 5-celled ovary; stam. 10 .	7. SPONDIAS.

Eminently inhabitants of the moist region of the low country, but a few also in the dry region to which *Semecarpus obscura* is restricted. *Semecarpus coriacea* and *S. nigroviridis* alone are found in the hills, the former being restricted to the montane zone.

1. **BUCHANANIA,*** *Roxb.*

Trees; l. simple; fl. bisexual, in axillary panicles; sep. 5, imbricate, persistent; pet. 5, imbricate; stam. 10, inserted outside disk; disk annular, lobed; carp. 5, distinct, only 1 perfect, the rest barren; funicle of ovule basal; drupe small, stone bony, 2-valved.—Sp. 20; 6 in *Fl. B. Ind.*

B. angustifolia, *Roxb. Fl. Ind.* ii. 386 (1832).
Thw. Enum. 78. C. P. 471.
Fl. B. Ind. ii. 23. Wight, Ic. t. 101.

A tree, young parts glabrous; l. 3½–6 in., oblong or lanceolate-oblong, acute, not tapering at base, obtuse or emarginate, entire, quite glabrous, shining above, coriaceous, petiole ½–¾ in., stout; fl. small, nearly sessile, in small, axillary, crowded, glabrous panicles shorter than the l.; sep. orbicular,

* Commemorates Francis Buchanan (afterwards Hamilton) M.D., F.R.S., superintendent of Calcutta Botanic Garden, 1814–15. Died 1829.

glabrous; pet. oblong-oval, obtuse, recurved; ov. pilose, style short; drupe broadly pyriform-ovoid, $\frac{1}{2}$ in., somewhat compressed.

Low country; rather rare. Jaffna (Gardner); Haldummulla; Galagama; Morowak Korale; Hantane 2000 ft. (Gardner). Fl. April; white.

Also in Southern India.

The Ceylon plant has rather thicker leaves and a little larger fruits than the type, and is called var. *zeylanica* by Engler (Mon. Phan. iv. 184).

Anacardium occidentale, L., the Cashew-nut, is so completely established in the low country, especially in sandy ground near the sea, as to have all the look of a native tree. There are specimens in Hermann's Herbarium. The Sinhalese call it 'Caju,' an adoption of the name used by the Portuguese, who no doubt introduced it. The Tamil name for the edible part is 'Montirikay.' It is figured in Bedd. Fl. Sylv. t. 163. Its native country is Tropical America, and 'Acaju' is the native Brazilian name.

2. **MANGIFERA**, *L.*

Large trees; l. simple; fl. polygamous, in terminal panicles; sep. 5, imbricate; pet. 5, with thick veins, imbricate; disk large, 5-lobed; stam. 5–8, only one fertile, rest barren and reduced in size, inserted within the disk; ov. 1-celled, funicle of ovule inserted on side near base, style lateral; drupe with a fibrous compressed stone.—Sp. 27; 20 in *Fl. B. Ind.*

M. zeylanica, *Hk. f. Fl. B. Ind.* ii. 16 (1876). **Ét-amba, Wal-amba,** *S.* **Kaddu-ma,** *T.*

Buchanania (?) *zeylanica*, Bl. Mus. Bot. i. 185. *M. indica*, Thw. Enum. 75 (non L.). Engler, Mon. 204. C. P. 1256, 2614.

Fl. B. Ind. ii. 16.

A very large tree, bark rather rough, brownish-grey, young parts glabrous; l. 2–6 in., lanceolate- or oval-oblong, much tapering to base, usually very obtuse, rarely shortly acuminate, glabrous, entire, coriaceous, venation reticulate, petiole about $\frac{1}{2}$ in.; fl. small, on rather long, slender, glabrous, jointed ped., in elongated, erect, stout, narrowly pyramidal, glabrous, terminal panicles; sep. ovate, obtuse, quite glabrous; pet. twice as long as sep., obtuse, clawed, reflexed; barren stam. reduced to short subulate processes; drupe $1\frac{1}{2}$ in., ovoid, compressed, smooth.

Forests of the low country in both moist and dry regions; common. Fl. Feb. March; pale yellow.

Endemic.

Attains a very large size.

Wood dull whitish, rather light, soft, coarse-grained. The fruit is occasionally eaten by the Sinhalese, but is very unpalatable. The tree is not cultivated.

M. indica, L. the common Mango, or 'Amba,' is cultivated, but not anywhere wild in Ceylon. It differs from the wild *M. zeylanica* in having the panicle more or less pubescent and less spreading, and in the acute or acuminate leaves of a thinner texture. It seems to be native in many parts of India.

3. **ODINA,*** *Roxb.*

Trees; l. imparipinnate; fl. unisexual, generally diœcious, in axillary panicles; cal. 4-lobed, imbricate, persistent; pet. 4, imbricate; stam. 8, inserted outside and beneath disk, sterile and very small in fem. fl.; disk annular, 8-lobed; ov. 1-celled, with the ovule pendulous from top, barren and reduced to 4 lobes in male fl.; styles 4, short, distinct, stigmas capitate; drupe small, reniform-ovoid, stone very hard.—Sp. 13; 1 in *Fl. B. Ind.*

O. Wodier,† *Roxb. Fl. Ind.* ii. 293 (1832). **Hik,** *S.* **Odi,** *T.*
Engler, Mon. 267. Thw. Enum. 78. C. P. 1161.
Fl. B. Ind. ii. 29. Wight, Ic. t. 60. Bedd. Fl. Sylv. t. 123.

A small deciduous tree, bark thick, brown, rather smooth, young parts nearly glabrous or finely stellate-puberulous; l. imparipinnate, rachis 6–10 in., cylindrical, glabrous, swollen at base, lflts. 2–6 pair and a terminal one, shortly stalked or nearly sessile, 3–5 in., lanceolate, acute or rounded, often unequal at base, more or less caudate-acuminate, entire or faintly crenate, glabrous, shining and deeply tinged with pink when young; fl. small, nearly sessile, in small clusters laxly arranged on elongated, slightly branched, stellate-pubescent, axillary panicles, appearing with the young leaves on the new shoots; cal. minute, hairy; pet. oblong-oval, obtuse, reflexed in fem. fl.; ov. large, oblong, glabrous, styles very stout, divaricate; drupe about ½ in., reniform-ovoid, obtuse, compressed, smooth, stone reniform, very hard.

Low country, in both dry and moist regions; common, especially in the former. Fl. Jan.–April, when the tree is bare of leaves; pinkish-yellow.

Throughout India, and in Burma and Andaman Is.; also varieties in Java and Trop. Africa.

One of the few deciduous trees of Ceylon.

Heart-wood red, rather heavy, moderately hard, close-grained. The stem affords a gum.

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* From the Tamil name.

† *Wodier* is said to be the Tamil name in S. India; probably merely another form of 'Odi.'

4. **SEMECARPUS,** *L. f.*

Trees, very rarely shrubs; l. simple, entire; fl. small, polygamous or diœcious, the male usually smaller, in terminal or axillary panicles; cal. 5-lobed, lobes deciduous; pet. 5, imbricate; stam. 5, inserted outside disk; disk broad, annular, faintly lobed; ov. 1-celled, with a single pendulous ovule, funicle basal; styles 3, stigmas clavate; drupe more or less obliquely ovoid, seated on a very large fleshy receptacle formed by the persistent, much-enlarged cal.-tube and disk, stone crustaceous; cotyledons plane-convex.—Sp. 38; 16 in *Fl. B. Ind.*

An erect unbranched shrub; inflor. cauline . . 1. S. MARGINATA.
Trees; inflor. terminal or axillary.
  L. peltate . . . . 2. S. SUBPELTATA.
  L. not peltate.
    L. hairy beneath . . . . 3. S. PUBESCENS.
    L. glabrous.
      Base of blade not tapering into petiole.
        L. very coriaceous.
          Petiole very short.
            L. sub-rotund . . . . . . 4. S. OBOVATA.
            L. lanceolate . . . . . . 5. S. MOONII.
            L. obovate . . . . . . 6. S. CORIACEA.
          Petiole long . . . . 7. S. WALKERI.
        L. not coriaceous.
          Lat. veins nearly horizontal . . . 8. S. GARDNERI.
          Lat. veins oblique . . . . . 9. S. ACUMINATA.
      Base of blade tapering into petiole.
          L. more than 3 in.
            L. oval, shortly acuminate . . . 10. S. NIGROVIRIDIS.
            L. oblong, obtuse . . . . 11. S. OBSCURA.
          L. under 3 in.
            Margin cartilaginous . . . . 12. S. PARVIFOLIA.
            Margin not cartilaginous . . . 13. S. LÆVIGATA.

The species are very difficult to discriminate, the flowers being much alike in all. The above key is based almost wholly on the leaves, but I am unable to determine the species by the venation-characters given in Engler's recent monograph (Mon. Phan. iv. (1883).

All our 13 species are endemic.

1. **S. marginata,** *Thw. Enum.* 77 (1858).
Engler, Mon. 476. Thw. Enum. 77. C. P. 2677.
Fl. B. Ind. ii. 32.

An erect, almost unbranched shrub, 6–8 ft. high; l. closely placed, very large, 8–15 in., obovate-lanceolate, tapering to narrow but cordate base, sharply acuminate, entire, bordered by a thick intra-marginal vein, outside which is a semi-

transparent, stiff, strong, parchment-like, horny, reflexed border with a sharp-cutting edge, glabrous on both sides, very stiff and coriaceous, lat. veins horizontal, petiole very short and thick, transversely wrinkled; fl. small, ¼ in., on slender articulated ped., panicles 3 or 4 in., much branched, coming off in clusters from the old wood of the stem for its whole length; cal. glabrous, lobes broadly triangular, acute; pet. oval, spreading, obtuse; drupe small, ⅜ in., almost dry, striate, red, receptacle as long as drupe, pear-shaped, brilliant crimson.

Moist low country; rare. Galle; Veddagalle; Ratnapura; Adam's Peak; Kuruwita Korale. Fl. Nov.–March; white.

Endemic.

Var. β. *hirsuta*, Thw. l. c. has the leaves stiffly hairy beneath, but of this I have seen no specimens.

Very unlike the rest of the species in habit; the horny border to the leaves is also very remarkable. The receptacle of the fruit is sweet and edible.

2. **S. subpeltata,** *Thw. Enum.* 75 (1858). **Maha-badulla,** *S.*
Engler, Mon. 476. C. P. 3004.
Fl. B. Ind. ii. 33.

A large tree, bark smooth, leaf-scars very prominent, young parts glabrous; l. very large, 9–15 in., lanceolate-oblong, rounded and peltate at base, suddenly and shortly acuminate, entire, with a marginal vein close to the edge, very coriaceous, glabrous and shining, lat. veins horizontal, petiole 1½ in., extremely thick; fl. sessile, articulated, panicles 6–10 in., with spreading branches, glabrous, from the axils of fallen l.; drupe much depressed, ½ in. long by 1¼ in. wide, slightly compressed, striate, receptacle large, broad, cupped.

Moist low country; rare. Kuruwita Korale; Singhe-Raja Forest; Hiniduma Kande. Fl. March.

Endemic.

The panicles are certainly axillary, not terminal, in this, and often come off from the old wood in axils of the fallen leaves. After flowering they become woody and greatly enlarged, reaching 12 in. in length, with thick branches bearing the fruit.

3. **S. pubescens,** *Thw. Enum.* 77 (1858).
Engl. Mon. 475. Thw. Enum. 77. C. P. 163.
Fl. B. Ind. ii. 31.

A small tree, branchlets and young parts densely pubescent; l. 5–12 in., narrowly oblong-lanceolate, obtuse at base, very acuminate, acute, entire, glabrous except on midrib above, softly hairy beneath, rather thin, lat. veins horizontal, curved, prominent beneath, petiole ¾ in., densely tomentose;

fl. $\frac{1}{2}$ in. diam., on short ped., panicles lax, 8–14 in., slightly branched, hairy; cal. glabrous; pet. veiny; drupe small, $\frac{1}{2}$ in., ovoid, slightly oblique, purplish-red, receptacle short, cupular.

Var. β. **Thwaitesii,** *Engl. Mon. Phan.* iv. 476. *S. Thwaitesii,* Hk. f. in Fl. B. Ind. ii. 31. C. P. 3886.

L. smaller, slightly hairy beneath, lat. veins more oblique; panicles less hairy.

Moist low country; very rare. Near Ratnapura. Var. β. Morowak Korale. Fl. March, September; pale green.
Endemic.

4. **S. obovata,** *Moon Cat.* 22 (1824). **Kalu-badulla,** *S.*
Engler, Mon. 495. Thw. Enum. 77. C. P. 3339.
Fl. B. Ind. ii. 32.

A moderate-sized tree, bark very smooth, whitish, young parts glabrous; l. closely placed at ends of branches, 3–7 in., nearly sessile, obovate-rotund, rounded or subcordate at base, entire, very coriaceous and stiff, glabrous, shining above, whole reticulate venation very prominent beneath; fl. $\frac{3}{8}$ in., panicles terminal, about 6 in., glabrous; drupe $\frac{1}{2}$ in., oblong-ovoid, apiculate, receptacle $\frac{1}{4}$ in., narrower than drupe.

Moist low country; rare. Kalutara (Moon); Ratnapura; Galle. Fl. Sept., Oct.; green.
Endemic.

5. **S. Moonii,** *Thw. Enum.* 77 (1858).
Engler, Mon. 490. C. P. 3338.
Fl. B. Ind. ii. 32.

A moderate-sized tree, bark smooth and shining, flaking off, young parts quite glabrous; l. large, 6–12 in., almost sessile, lanceolate, tapering or slightly rounded but not decurrent on petiole at base, shortly acuminate, entire, with a narrow, sharp, cartilaginous margin, very coriaceous, lat. veins horizontal and with the connecting reticulations very prominent beneath, petiole very short, thick; fl. $\frac{1}{4}$ in., nearly sessile, panicle terminal, large, 6–12 in., pyramidal, minutely puberulous; drupe (not ripe) $\frac{5}{8}$ in., apiculate, striate, receptacle small, narrower than drupe.

Moist low country; very rare. Kalutara. Fl. Sept., Oct.; green.
Endemic.

6. **S. coriacea,** *Thw. Enum.* 76 (1858). **Badulla,** *S.* (of the hills).
Engler, Mon. 490. C. P. 313.
Fl. B. Ind. ii. 32.

A moderate-sized or large tree, with smooth shining bark, ultimate branchlets thick, with prominent leaf-scars; l. closely

placed, 4–6 in., obovate-oblong, tapering to acute or slightly rounded base, rounded or emarginate at apex, extremely coriaceous, lat. veins nearly horizontal, curved, and with the connecting reticulations rather prominent beneath, petiole very short, stout; fl. rather large, fully ½ in., panicle terminal, short, 3–6 in., very stout, much branched, glabrous or slightly pilose; drupe over 1 in. wide, ¾ in. long, compressed, strongly apiculate, receptacle small, ⅜ in., scarcely cupped.

Forests of the montane zone, above 4000 ft.; common. Fl. April; pale green.

Endemic.

The common 'Badulla' of the hill-forests, and our only high mountain species, though *S. nigro-viridis* extends into the lower hills.

7. **S. Walkeri,** *Hk. f. in Fl. B. Ind.* ii. 33 (1876).
Engler, Mon. 491. *S. obscura*, Thw. (part) Enum. 410. C. P. 2940.
Fl. B. Ind. ii. 33.

A moderate-sized tree, young parts glabrous; l. 4–8 in., oblong-lanceolate, acute or obtuse at base, acuminate, often twisted at apex, stiffly coriaceous, lat. veins nearly transverse, with the connecting reticulations rather prominent beneath, midrib somewhat channelled above, petiole 1–1½ in., thickened at base; fl. nearly ½ in., panicles terminal and axillary, 4–6 in., slightly branched, slender; drupe over ½ in., ovoid, not oblique, receptacle cup-shaped, enclosing half the drupe.

Moist low country up to 2000 ft.; common (?). About Kandy; Allagala; Hewesse. Fl. March; pinkish-green.

Endemic.

8. **S. Gardneri,** *Thw. Enum.* 76 (1858). **Badulla,** *S.*
Engler, Mon. 491. C. P. 1257.
Fl. B. Ind. ii. 33.

A moderate-sized or large tree, with finely grooved grey bark, young parts glabrous; l. large, 6–13 in., narrowly lanceolate-oblong, acute or slightly rounded at base, not decurrent on petiole, shortly acuminate, entire, somewhat undulate, rather thick but not coriaceous, bright green and shining above, paler beneath, midrib very broad, lat. veins horizontal, intermediate reticulations very fine, with included curved free veinlets, conspicuous beneath, petiole 1–1½ in., stout; male fl. ¼ in., bisexual ones over ½ in., panicles terminal and axillary, 6–12 in., slightly branched, glabrous; drupe very oblique, nearly 1 in. wide, apiculate, receptacle large, swollen, much wider than drupe, cup-shaped, red.

Moist low country, up to 3000 ft.; common. Hewesse; Singhe Raja Forest; Morowak Korale; Ambagamuwa; Kandy. Fl. Dec.; green.

Endemic.

The commonest species in the low country of the moist region. The character of the ultimate reticulation of the veins in this and the next is remarkable, but not conspicuous till the leaves are dried.

A nearly black resin is afforded by the bark.

9. **S. acuminata,** *Thw. Enum.* 76 (1858).
Engler, Mon. 495. *S. oblongifolia*, var. γ., Thw. Enum. 410. C. P. 2676.
Fl. B. Ind. ii. 33.

A moderate-sized tree, glabrous throughout; l. 6–10 in., lanceolate-oblong, obtuse or acute at base, but not decurrent on petiole, tapering to long caudate-acuminate apex, glabrous, thin, midrib broad, lat. veins very oblique, intermediate reticulations as in *S. Gardneri*, petiole $\frac{3}{4}$ in., stout; fl. small, under $\frac{1}{4}$ in., panicles small, under 3 in., axillary or terminal, very slender, slightly branched; drupe not seen.

Var. β. **intermedia,** *Trim.*

L. smaller, 3–7 in., very slightly decurrent on petiole at base, more suddenly caudate-acuminate, stiffly coriaceous, lat. veins more horizontal, reticulations coarser, much more prominent beneath, petiole $\frac{1}{2}$–$\frac{3}{4}$ in., channelled above; fl. nearly $\frac{1}{2}$ in., panicles over 4 in., terminal, stouter; drupe large, $1\frac{1}{4}$–$1\frac{1}{2}$ in., cordate-ovoid, obliquely acuminate, receptacle $\frac{5}{8}$ in., much narrower than drupe, obconic.

Moist low country; very rare. Singhe Rajah Forest. Var. β. commoner; Ambagamuwa; Ratnapura; Dolosbagie. Fl. Feb., March; pale green.

Endemic.

Var. β. is probably a distinct species, but Thwaites does not distinguish it even as a variety. Engler's description of *S. acuminata* refers chiefly to this var., whilst Fl. B. Ind. describes the type as here considered.

The plant from Dolosbagie has longer petioles, and the leaves more shortly acuminate; it may be another variety or species. It was referred to C. P. 631 (*S. nigroviridis*) as a 'large form' by Thw. (in Herb. Perad.).

10. **S. nigro-viridis,** *Thw. Enum.* 76 (1858).
Engler, Mon. 492. *S. oblongifolia*, var. β. Thw. Enum. 410. C. P. 631 (2444, 2586).
Fl. B. Ind. ii. 34.

A moderate-sized tree, glabrous throughout; l. often crowded at ends of branches, 3–6 in., obovate-oblong, narrowed at base and tapering into petiole, suddenly and shortly caudate-acuminate, obtuse, with a narrow cartilaginous margin, somewhat undulate, coriaceous, dark green, lat. veins horizontal, curved, and with the reticulations prominent beneath, petiole $\frac{1}{4}$–$\frac{3}{4}$ in., channelled above; fl. nearly $\frac{1}{2}$ in., panicles 3–5 in., terminal, stout, with horizontal branches;

drupe nearly 1 in., broadly ovoid, somewhat compressed, obliquely acuminate, receptacle $\frac{1}{4}$ in., narrower than drupe, cup-shaped.

Moist country, extending into the montane zone to 4000 ft.; common. Fl. Feb.–April; green.

Endemic.

At the higher elevations the leaves are often smaller and more leathery, and the tree reduced to a much-branched shrub.

S. cuneata, Engl. Mon. 493, is based on a specimen of C. P. 631, and is described as differing from *S. nigro-viridis* by its membranaceous leaves with longer petioles. I do not clearly recognise it.

11. **S. obscura,** *Thw. Enum.* 76 (1858). **Badulla,** *S.*
Engler, Mon. 494. *S. oblongifolia*, Thw. Enum. 76. C. P. 2556, 1258.
Fl. B. Ind. ii. 33.

A moderate-sized or large tree, glabrous throughout; l. rather crowded at ends of branches, 4–8 in., oblong- or obovate-oblong, much tapering at base and decurrent on petiole, rounded or obtuse or bluntly acuminate, coriaceous, with a narrow cartilaginous margin, shining above, lat. veins nearly horizontal and with the intermediate reticulations prominent beneath, petiole variable, $\frac{1}{4}$–$\frac{3}{4}$ in. or scarcely any; fl. $\frac{1}{3}$ in., panicles terminal, of male 4–8 in., of bisexual much shorter, slender, much branched; drupe $\frac{1}{2}$–$\frac{3}{4}$ in., ovoid, slightly compressed, more or less obliquely acuminate, receptacle $\frac{1}{4}$–$\frac{3}{8}$ in., wide, cup-shaped.

Low country, principally in the dry or intermediate region; rather common. Batticaloa; Uma-oya; Medamahanuwara; Maturata; Deltota. Fl. Feb., March; pale green.

Endemic. The only species in the dry region.

Thwaites' typical *S. obscura* (C. P. 2556) is from Deltota, and has very coriaceous leaves and a larger, more cup-shaped receptacle.

12. **S. parvifolia,** *Thw. Enum.* 77 (1858).
Engler, Mon. 492. C. P. 3444.
Fl. B. Ind. ii. 34.

A moderate-sized tree, glabrous throughout; l. small, 2–3 in., crowded at the ends of the annual growths, oval or lanceolate, tapering into petiole, very shortly and obtusely acuminate, stiffly coriaceous, with a narrow cartilaginous margin, midrib very broad, lat. veins horizontal and with the coarse reticulation very prominent beneath, petiole $\frac{1}{2}$ in., tumid at base, channelled; fl. $\frac{1}{3}$ in., panicles (or rather racemes) terminal and axillary, few-flowered, 2–3 in.; drupe (not ripe)

$\frac{3}{4}$ in., ovoid-conical, very sharp-pointed, only slightly oblique, receptacle nearly $\frac{1}{2}$ in., turbinate.

Low moist region; very rare. Only from Hiniduma, S. Prov. Fl. May; pale green.
Endemic.

13. **S. lævigata,** *Thw. in Fl. B. Ind.* ii. 35 (1876).
Engler, Mon. 493. C. P. 3948.
Fl. B. Ind. ii. 35.

A tree, bark of branchlets white, marked with conspicuous leaf-scars, glabrous; l. small, 2–3 in., crowded at ends of annual growths, oblong-oval or slightly obovate, tapering into petiole, suddenly and shortly acuminate, obtuse, undulate, coriaceous, petiole $\frac{1}{4}$–$\frac{3}{8}$ in.; fl. not seen; drupe (not ripe) $\frac{3}{8}$ in., apiculate, receptacle as long and as broad as drupe.

South of the island (Thwaites). Only known from the C. P. specimens which are in young fruit, collected June 1867.
The material for this species is very scanty.

5. NOTHOPEGIA, *Bl.*

Trees; l. simple, entire; fl. polygamous, in small spicate axillary racemes; cal. 4-fid, persistent; pet. 4, imbricate; disk small, annular; stam. 4, inserted on disk; ov. 1-celled, ovule suspended from the side near the top, style 1, very short, stigma capitate; drupe depressed-globose, stone thin, hard; seed with very thick plane-convex cotyledons.—Sp. 3; all in *Fl. B. Ind.*

N. Colebrookiana,* *Bl. Mus. Bot.* i. 203 (1849). **Bala,** *S.*
Engler, Mon. 467. *Glycycarpus racemosa*, Dalz., Thw. Enum. 78. C. P. 1260.
Fl. B. Ind. ii. 40. Wight, Ic. t. 236 (*Pegia*). Bedd. Fl. Sylv. t. 164 (from a Ceylon specimen).

A small tree, with smooth, thin, brown bark, buds pilose; l. rather small, $2\frac{1}{2}$–$4\frac{1}{4}$ in., narrowly lanceolate-oblong, acute at base, acuminate, entire, often undulate, glabrous and shining above, paler beneath, lat. nerves numerous, intermediate reticulation minute, pellucid, not prominent; fl. small, nearly sessile, in axillary, erect, spicate racemes shorter than the l., longer and laxer in male, crowded and short in the bisexual;

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* In honour of H. T. Colebrook, F.R.S., of the Bengal Civil Service, who wrote on Terebinthaceous plants in 1826. Died in 1837.

cal.-teeth shallow; pet. oblong, obtuse; ov. glabrous; drupe $\frac{5}{8}$ in. wide, fig-like, longitudinally striate, purple, pulp copious.

Moist region up to 3000 ft.; common. Fl. March; greenish-white. Also in West Peninsular India.

Wood yellowish, rather heavy, smooth-grained, easily splitting.

6. CAMPNOSPERMA, *Thw.*

Trees; l. simple, entire; fl. minute, bisexual, in axillary racemes; cal. deeply 3-fid, persistent; pet. 3; stam. 6, inserted outside and below disk; disk large, cup-shaped, fleshy; ov. 1-celled, ovule pendulous from apex, style nearly absent, stigma large, dilated, lobed; drupe ovoid, stone bony, with a vertical process projecting into the upper half of the cavity; seed curved round the process, cotyledons flat, oblong.—Sp. 4; all in *Fl. B. Ind.*, but none in Peninsular India.

C. zeylanicum, *Thw. in Kew Journ. Bot.* vi. 65 (1854). **Aridda,** *S.*

Engler, Mon. 318. Thw. Enum. 78. C. P. 246.
Fl. B. Ind. ii. 41. Kew Journ. Bot. vi. t. 1, A. Bedd. Fl. Sylv. t. 168.

A moderate-sized or large tree, with a very straight erect trunk, bark roughish, not furrowed, whitish- or yellowish-grey, branchlets with conspicuous leaf-scars, young parts with ferrugineous scales; l. crowded, 5–9 in., oval or obovate-oval, attenuate into very short petiole, rounded, often emarginate at apex, entire, coriaceous, glabrous and shining above, paler, reticulated and with minute, scattered, rufous scales beneath; fl. very small, shortly pedicellate, in erect, axillary, spicate racemes shorter than the l., peduncle stout, glabrous; cal.-segm. triangular; pet. erect, broadly triangular, acute; ov. free, but enclosed in cupular disk; drupe $\frac{5}{8}$ in., apiculate, pulpy, purple.

Moist low country, below 1500 ft.; rather rare. Singhe Rajah Forest; Hewesse; about Ratnapura; Ambagamuwa; Veddagalle; Kuruwita Korale, abundant. Fl. March; white.

Endemic.

A handsome tree with fine dark foliage. Attains a great height in Kuruwita Korale, and 6 or 7 ft. in circumference. In a few forests this is a gregarious tree.

Wood white, smooth, rather light and soft, coarse-grained, of little use except for tea-boxes, for which it is said to be very good.

7. SPONDIAS, *L.*

Deciduous trees; l. imparipinnate; fl. polygamous, in terminal panicles; cal. 5-fid, deciduous; pet. 5, valvate;

stam. 10, inserted outside and beneath disk; disk large, expanded; ov. partly immersed in disk, 5-celled, with 1 pendulous ovule in each cell, styles 5, distinct, short; drupe large, ovoid, stone spongy-woody, very hard, 5-celled, usually only 1-seeded; cotyledons flat.—Sp. 8; 4 in *Fl. B. Ind.*

S. mangifera, *Willd. Sp. Pl.* ii. 751 (1799). **Embarella,** *S.* **Ampallai,** *T.*

Moon Cat. 36. *Evia amara*, Comm., Thw. Enum. 78. Engler, Mon. 248. C. P. 1263.

Fl. B. Ind. ii. 42. Bedd. Fl. Sylv. t. 169. Wight, Ill. t. 76.

A small or moderate-sized deciduous tree, with a straight trunk and smooth, pale bark, young parts glabrous; l. large, pinnate, rachis 9–12 in., thickened at base, cylindrical, striate, glabrous, lflts. 3–5 pair and a terminal one, opp. or alt., articulated, very shortly stalked, 3–6 in., oval or oblong-oval, often rather unequal at base, acuminate, quite entire, glabrous, thin, lat. veins numerous, horizontal, straight, pellucid, connected by a strong intra-marginal one; fl. $\frac{1}{4}$ in., sessile, in small clusters on the spreading branches of stout, erect, pyramidal, glabrous, terminal panicles, appearing before the young l.; pet. acuminate, reflexed; disk 10-lobed; drupe ovoid, 2 in., smooth, yellow, flesh firm with a milky juice, stone very large, thick and woody, cells small, usually all empty but one.

Moist low country; common, often planted. Fl. Jan.; pale pinkish-green.

Throughout Tropical Asia.

Wood whitish, soft, light, useless. The fruit is called the 'Hog-Plum,' and is eaten, but is unpalatable unless preserved.

This is deciduous and quite bare of leaves for a short time at end of the dry weather. The young foliage, which appears in April, is a beautiful orange-pink colour. All the plant has a strong terebinthinate odour when bruised.

Moringa pterygosperma, Gaertn. (*M. zeylanica*, Pers.) is much cultivated in native gardens, and appears semi-wild. There are specimens in Hermann's Herb. (Fl. Zeyl. n. 155), and it is figured in Burm. Thes. t. 75. Well known as *Murunga*, S. and as 'Horse-radish tree' by the English. The long fruit is much eaten in curries, and the root is a good substitute for horse-radish, the seeds afford an oil. Native of Northern India. *Moringa* has a remarkable floral structure, and forms of itself the small order *Moringaceæ*.

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